Know Your Child

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ГОСУДАРСТВЕННОЕ ИЗДАТЕЛЬСТВО
МЕДИЦИНСКОЙ ЛИТЕРАТУРЫ

ЛЕНИНГРАД

2288

Know Your Child

SELECTED ARTICLES

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by Miriam KATZ

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This book is intended for a wide circle of readers—mothers and prospective mothers. Its articles deal with the hygiene of pregnancy and preparation for confinement, with the anatomic and physiologic features of childhood, with the nursing, training and hardening of babies and older children by exercises and massage. Part of the book is devoted to the most common diseases of childhood, preventive inoculations and first measures in cases of sudden illness, before the doctor arrives. Some space has also been allotted to the activities of women's health centres and child-care institutions.

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TO THE READER

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FROM THE EDITOR

The joy, hope and future of every family is tied up with children. It is a great happiness for every mother to know that her child is healthy, happy, and contented, eats well and sleeps soundly, is obedient, and develops normally both physically and mentally.

And, on the other hand, even a relatively mild ailment, or some abnormality in a child's physical or mental development causes a mother much sorrow, sleepless nights, and provokes bitter tears. This distress may be avoided, or at least considerably mitigated, with no shadow darkening the life of the family, if the child is handled properly from the very first days of his life, if the future baby is thought about while it is still in its mother's womb.

The Soviet state ensures all citizens the opportunity for bringing up their children and for preventing sickness among them. The number of prophylactic and curative medical institutions caring for the health of mothers and children increases from year to year, forming a gigantic network of mother and child health centres, maternity homes, crèches, nursery schools, day schools, boarding schools, young pioneer camps, health-promoting playground centres, and sanatoriums for children and their mothers; these institutions provide for the birth of healthy children and for their proper development subsequently. Every woman must know that the health of her future child depends to a great extent on her own health, habits, nutrition, and course of pregnancy.

This is why every expectant mother must have a thorough medical examination, and if necessary must take adequate treatment; throughout her pregnancy the future mother should regularly visit her doctor at the women's health centre and follow his advice closely.

In the majority of cases the birth of weak, premature, or sickly infants may be avoided by timely treatment of the mother, by regulation and adjustment of her diet, work, and daily routine.

Babies should be under constant medical observation from the very first minutes of their life, first at the maternity hospital, later at the district health centre and polyclinic for children. An important thing to remember is that it is always easier to prevent a disease than to cure it. The state has taken upon itself the lion's share in promoting child welfare, but that does not mean that parents can just stand by and look on. This is a self-evident point: the child's life is, as a rule, spent prevalently at home, therefore, domestic surroundings, routine, eating habits, and training are the factors on which the child's development and the prevention of diseases depend.

An attentive mother immediately notices the first signs, sometimes quite insignificant ones, of indisposition in her child. The subsequent course of the disease and its termination frequently depend on prompt medical advice and on what is done prior to the doctor's arrival. A mother must know many things in order to be able to bring up her child properly. The present selection contains a number of articles dwelling on the essential points in the nutrition and upbringing of healthy children, as well as basic information on the most common of children's diseases and their prevention.

The authors who contributed to the compilation of this book hope that their advice and recommendations will be of some aid to mothers in the noble and responsible job of bringing up their children—our future generation.

Professor *A. Tur*,
Member of the U.S.S.R. Academy of Medical Sciences

Introduction

IN THE U.S.S.R.
THE ENTIRE POPULATION
IS RESPONSIBLE
FOR CHILD WELFARE

A wave of warmth and tenderness is evoked in the sternest and most austere people by children's smiles, bright eyes and merry prattle.

Children are our future, the heirs to the great achievements of our time.

From the first days of its existence the Soviet state concerned itself with the care of mothers and children by organising a state system of mother and child welfare. A wide network of children's institutions supervises the health of the child from birth until he graduates from school.

Ever-increasing sums are annually assigned for expanding scientific research in the field of children's diseases, for building and maintaining child welfare institutions, for aiding mothers in bringing up their children. All the best in the land is given to children, so that our future citizens may grow up strong and healthy.

Our basic medical principle is the prevention of disease; therefore, care of the child begins long before its birth.

The women's health centre system provides medical observation of the health of the pregnant woman, thorough physical examination, and all measures conducive to the birth of healthy, full-term babies.

The women's health centre provides medical treatment for the prospective mother, has her transferred to lighter work, teaches her how to prepare herself for childbirth, plans her daily routine at home and at work, advises her on her diet.

The health centre organises cycles of lectures for pregnant women to expand their knowledge in the field of the hygiene of pregnancy and care of the newborn. If any deviations from normal occur in the health of the pregnant woman she is given accommodation in the prenatal department of a maternity hospital. It is the duty of the women's health centre to provide all forms of special medical and legal advice. Experienced lawyers give legal advice and aid in questions concerning the rights of pregnant women and mothers according to Soviet legislation.

Special sanatoriums have been set up for prospective mothers where they can spend their pre-confinement leave. The maternity homes provide qualified obstetric aid and pediatric services for the newborn.

The network of these special establishments that care for the health of mothers and children has grown immensely. Suffice it to say that there was not a single women's health centre prior to 1917 in Russia, while at present 8,000 such establishments provide medical advice and treatment for expectant mothers from the very first days of their pregnancy, and all free of charge.

The number of beds in maternity homes was only 6,824 in 1917, and only 5 out of every hundred women could receive qualified obstetric aid during childbirth (in the majority of cases these services had to be paid for). Currently there are 221,000 obstetric beds in urban and rural hospitals.

Over 30,000 kolkhoz maternity hospitals have been built in the villages by the collective farms to provide farm women with medical services. A specially trained 30,000-strong army of obstetricians is responsible for mother and child health.

The health of the child-to-be is also the concern of the children's health centres and polyclinics, where the future mother is instructed on care of the newborn infant and on preparing its layette.

After the mother brings her baby home the district pediatrician and patronage nurse visit them; they teach the mother how to care for and manage the infant, how to feed him and how to plan the daily schedule for both herself and the baby. The advice and help of the pediatrician and nurse are particularly important during the first month of the baby's life, when he is just adapting himself to the external environment and his resistance to infections is still low.

Subsequently the patronage nurse visits the baby regularly, checking on how the doctor's instructions are followed and helping the mother with her advice.

In the first year of his life the baby is examined by the pediatrician regularly, once a month, for prophylactic purposes. The doctor checks the baby to see that he is developing normally and fed properly, and takes a number of precautions against the development of rickets and infectious diseases of childhood.

Particular attention is paid to the timely administration of preventive inoculations that protect our kiddies against severe diseases such as smallpox, diphtheria, poliomyelitis, whooping cough. The conscientious attitude toward disease displayed by the mothers of Leningrad made possible the timely inoculation of the child population of this city against diphtheria, so that this grave children's disease no longer threatens the city. And other children's infectious diseases will be overcome in the same manner, thanks to the understanding cooperation of parents who have their children properly inoculated (e.g., since 1960 inoculations against whooping cough have been instituted, and we have already observed a sharp decrease in the morbidity rate of this disease). We consider that the physical training of children from a very early age is highly important. The childrens' doctor and the patronage nurse teach the mother how to exercise and massage her child in the second or third month of his life; coupled with a proper schedule and hardening procedures these measures guarantee normal development and resistance to diseases. The district pediatrician is the mother's best friend and adviser, he shares the mother's joys and sorrows in regard to her child's health. We widely encourage mothers to attend the child health centres regularly, and to seek for the doctor's advice upon the appearance of the mildest signs of illness. Our chief task is the prevention of diseases, and only after that comes timely diagnosis and treatment.

Regular prophylactic examinations are made by the doctor before a child is accepted at a crèche, nursery school, or school, all these establishments have their own doctors who take over medical supervision.

This orderly system of constant prophylactic supervision until the child finishes school has been conducive to promoting the health of our children, improving their physical development, inuring them to natural factors, and to raising their stamina and their resistance to incidental harmful influences.

Over 60,000 pediatricians—specialists in children's diseases—have dedicated themselves to child welfare. The network of child welfare establishments grows from year to year: prior to 1917 there were only 9 children's health centres, at present their number is 9,000.

Children's hospitals house 260,000 beds. All Soviet medical researchers in the field of pediatrics participate in the work of institutions for children, introducing all their achievements into routine practice.

Child mortality has decreased sharply; it is now 8 to 10 times lower than in 1913, and goes down annually. A wide network of health universities has been set up all over the country, raising the sanitary culture of the population and providing grounds for a still greater decrease of disease incidence among children.

There are 120,000 sanatorium accommodations for children in need of special treatment; forest schools have been founded for the prolonged treatment of tuberculous and rheumatic children, where therapy under the supervision of qualified specialists is combined with schooling. Accommodation at these sanatoriums is free of charge.

Crèches and nursery schools are moved out into the country for the summer, schoolchildren go to camps. About 8 million children annually spend their summers out of town in salubrious conditions.

A wide network of crèches and nursery schools provides care for five million children of working mothers. However, this is not enough to meet requirements, and therefore the CC CPSU has specially pointed out the urgent need for a further expansion of these institutions; in 1965 over 6 million children will attend them. Besides the permanent crèches and nursery schools there are also seasonal crèches and nursery schools in rural districts, and playgrounds in towns.

Crèches and nursery schools (formerly separate establishments) are now being united into one establishment; this is done to facilitate better observation of the development of the child, and is more to the interest of the mother.

Universal secondary education, free of charge, is guaranteed in the U.S.S.R. Every 7 or 8 year-old child is obliged to attend school. To date there are 228,000 schools in the Soviet Union, enrolling 39 million children. The Party and Government have decreed an expansion of boarding school accommodations; in 1962 there were 365,000 pupils in these schools, but in 1965 their number will grow to 2,500,000.

The health of schoolchildren and their development are supervised by the school doctor and nurse assigned by the local children's polyclinic. Soviet law protects the labour rights of adolescents and provides for special medical examinations to see that their health is not impaired and that their working conditions are adequate.

Soviet law also includes certain measures for protecting women's health: hard physical labour is not permitted, pregnant women are transferred to easier work in the sixth month of pregnancy at former wages, and given 112 days of paid pre-confinement and post-confinement maternity leaves; in cases of diseases during childbirth the post-confinement leave is extended to 70 days (instead of 56). Nursing mothers are allowed intervals in their work every three hours to nurse their babies, in rooms specially allotted for this purpose at places of work.

Mothers have the right to additional leave (without pay) after their paid maternity leave ends, up to the child's first birthday; after this they may return to their former place of work, and their service-record continues for the first year of the child's life even when they do not work.

Industrial and other enterprises have special female hygiene facilities.

Mothers with large families and unmarried mothers are annually paid out over 5 hundred million rubles in grants.

The CC CPSU adopted a decree "On Measures for Improving Medical Services and Public Health Protection" on January 14, 1961; this decree points out a series of new concrete measures for improving mother and child health services; it is another proof of the great care and attention lavished on children in the Soviet Union.

Part One

PRENATAL CARE OF THE CHILD

WHAT IS MOST IMPORTANT

Children are the most important thing not only in the life of a woman, but in the life of society at large, and of the state. Children represent the future, and there can be no future without a present. All our personal and social achievements would be futile if we did not know that we shall eventually be replaced by millions of new beings, by new energy and new talents that will take the best we have achieved in our day and will pass it down to their children and grandchildren, to the new generations, to those who are destined to make life a most wonderful thing.

But without speaking of this remote future that children alone can realise, let us look into any family, any home; we shall see the bareness of homes devoid of inquisitive, touchingly trustful little souls.

And still sadder is a home where there is a sickly, puny, unsmiling child. It is indeed a tragedy for a mother when she brings forth a premature baby, or one that is sickly or affected with some congenital deformity, after all the months she has been looking forward to his arrival with love and hope. It is no easy thing to make such a child well, to bring him up. And in some cases all efforts are unsuccessful.

Is there any way of ensuring that all infants are born healthy? Is there any way of avoiding premature deliveries, congenital diseases, deformities? And if there is, then what is this way?

Modern medical science has made it possible to avoid many abnormalities and diseases of the newborn. And the Soviet state creates all conditions for the realisation of this possibility. Soviet law makes working conditions easier for prospective mothers, grants special maternity leave before and after confinement. There are approximately 8,000 women's health centres and 79,000 obstetric posts that supervise the health of pregnant women, examine them regularly, and take all measures to ensure a normal pregnancy. All women enjoy the opportunity of having their babies delivered by qualified medical staff in hospitals.

However, all these state measures are useless if the women themselves do not understand what is required of them, if they, owing to misunderstanding or ignorance, do not utilise their rights and opportunities or do not follow all the rules of hygiene. Not only future mothers, but fathers, too, must understand that the birth of a healthy child requires, first of all, healthy parents, and that the future being must from its very conception be provided with favourable conditions for normal development, i.e., the future mother must receive proper care. One must learn what is harmful and what is salutary for a pregnant woman by reading special books, attending schools for mothers and universities of health.

"But now," say some people, "how is it that our great-grandmothers and great-great-grandmothers read no books, but gave birth with no trouble to many children, and healthy ones at that?"

True, formerly women did give birth many times, but not always without trouble. The childbed mortality rate in those long-ago days was as high as 20 per cent, a terrible figure in comparison with the hundredths of a per cent observed now. And their children were by far not always born healthy. There were many premature deliveries, stillbirths, and weak infants that died soon after birth. On the average no more than 70 infants out of every hundred born lived to their first birthday. But the attitude toward children was different in those days, and some parents would even say, in sad relief, "God has taken an extra mouth away". The people were ignorant and impoverished, while the state did not bother with public health problems. Only solitary outstanding individuals drew attention to the high infant and child mortality and tried to do something about it. Thus, M. Lomonosov, troubled by the high mortality rate among children, appealed to the government, stating that it was necessary to issue popular literature on the hygiene of pregnancy and baby and child care. But separate individuals could not achieve any essential benefits for the illiterate and downtrodden people. Women went on with their strenuous work right up to confinement, and often even had their babies right in the field, with no help at all, resuming their work soon after childbirth.

However, even if attention were at that time paid to the great number of stillbirths and infant mortality, science was in those days not yet in a position to explain the causes of many diseases, and physicians could not then avail themselves of the many health-promoting measures known now. Children did not die among the so-called lower classes alone, they also died in the families of the boyars and tzars (the nobility and royalty). Of the eleven children born to Peter the Great only three lived.

To date the system of the pregnant woman and all the factors that may affect the viability of the fetus are well known. It is known, for instance, that influenza and other infectious diseases can be the cause of premature deliveries and stillbirths; that the absence in the mother's blood of the so-called rhesus-factor is the cause of a grave disease in the newborn, the hemolytic disease; that oxygen deficiency may lead to abnormal development of the fetus; that certain drugs taken during pregnancy may have a harmful effect on the future child. And many more things are known now. Many measures for protecting the child have been proposed and already introduced into practice.

There are also other considerations that condition the need for particular care of the pregnant woman, both for her own sake and for that of her child: modern people, people of the twentieth century, are not to be compared with their ancestors. Civilisation and culture have led them away from nature and have brought many changes in their environment. The new environmental conditions have given rise to manifold new impressions, unknown and inaccessible to man of previous ages. The various physiological changes caused by these external stimulations in the maternal organism are transmitted to the fetus, and thus affect it, too.

Therefore in our age the pregnant woman and her future child need particular attention.

A most essential point is that in the U.S.S.R. human life is the most valuable and cherished thing. A child is now no extra mouth to feed, but an always welcome and desirable member of society, and therefore both the state and the family do all they can for him to be born normal and healthy. And therefore, too, a girl must be prepared beforehand for future motherhood, she should be sensibly looked after and taught personal neatness, her physical and moral upbringing should develop her into a well-balanced, energetic, vivacious and intelligent young woman, for this is what the mother of a healthy child must be.

And this is why every woman should have an adequate store of medical knowledge, and should, in particular, be properly schooled in female hygiene, the subject of the following chapter.

FEMALE HYGIENE

The word hygiene comes from the Greek word *hygieia*, meaning health; in other words, hygiene is the science of health, i.e., of what is conducive to good health and what is detrimental.

Hygienic and health-promoting measures are enacted on a state-wide scale in the Soviet Union; they are part of the overall plans of industrial, agricultural, and cultural construction. All undertakings are aimed at one goal — man's health, and the all-round advancement of his personality and welfare; this is the purpose of all the labour laws, of the building of new and spacious plants and factories, of urban landscape planning, of physical culture, of the wide network of curative and prophylactic institutions, of the shorter work-day, and of many other measures that have been and are being taken. However, the realisation of the aim of all these state measures is possible only when the population itself follows all the rules of individual hygiene, when in their private life and activities all people do everything needed for the development of their abilities, when they adhere to normal schedules of mental and physical work, when they rest, eat, and dress properly, and engage in physical culture and sports.

All these hygienic rules must be known and followed by both men and women. Many books have been written and many lectures delivered on the subject. But besides general knowledge of hygiene, women also have to have some special knowledge of female hygiene. The female body is much more complex than that of the male as its purpose is not only vital activity, not only the conception of a new life, but also the creation of this new life within itself. And since the important biological and social role of woman is continuation of the human race it behoves us to consider from this viewpoint the entire behaviour pattern of woman and all the requirements of the female body, starting with the first day of a baby-girl's life.

When a little girl is born into a family the mother must already understand the specificities and peculiarities of the female body in order to be able to handle her baby properly from the very first day. No matter what the future holds for the little girl, she must be ready for motherhood. Therefore every mother must be acquainted with the anatomy of the female reproductive organs and their function, with the routes by which infection may penetrate into them, with the various factors that affect the development and function of these organs.

Let us consider the female organism from this point of view.

The organs that directly participate in the conception, gestation, and delivery of a baby are the genital or sex organs; they consist of the ovaries, the uterine or Fallopian tubes (the oviducts), the uterus, and the vagina. These organs are situated in the pelvis directly adjacent to the urinary bladder in front and the rectum in back. The entrance to the vagina (the vulva) is between the outlet of the urethra and the anus. This localisation of the vagina necessitates scrupulous care of the external genitals to avoid contamination and penetration of any infection from the rectum or bladder.

The vagina is a muscular canal, easily distended, sheathed by a mucous membrane. The orifice of the vagina is blocked by the hymen, a thin membraneous partition with a small opening through which the menstrual blood is discharged. The first sexual intercourse ruptures the hymen.

The upper part of the vagina ends blindly in the circumference of the uterine cervix that bulges into the vagina.

The uterus (the womb) is divided into two main parts: the cervix which is directed downward, and the body. The uterus of an adult woman is just somewhat smaller than her fist. The slit-like uterine cavity is continuous with the cervical canal in its lower part, while its upper part branches into two symmetric passages, the uterine tubes, that run at almost right angles to both sides of the uterus. The uterus is the organ in which the fetus develops; during pregnancy the uterus becomes greatly expanded, reaching 1 kg in weight, while normally it weighs no more than 40-50 g. The uterine tubes, or oviducts, are the route along which the ova travel from the ovaries to the uterus. The oviducts terminate freely in the abdominal cavity in close proximity to the ovaries; their outer edges carry fringes (the fimbriae) which catch the ovum as it falls out of the ovary.

The most essential of the generative organs are the ovaries, a pair of organs hanging freely in the ovarian ligament, a band of connective tissue running from both sides of the uterus to the pelvic walls. The ovaries are the organs in which the formation and ripening of the ova takes place. Each ovary is approximately the size of a small elongated plum. Already at birth the ovaries of a baby-girl contain numerous ova, or germ cells. The maturation of these cells starts when the girl is 14-15 years old, and commonly only one ovum (cell) ripens every month. The vesicle containing the cell grows, rising to the surface of the ovary, and then bursts; the ovum falls out into the peritoneal cavity, is caught up by the fringed edges of the uterine tubes, whence it works its way down into the uterus, via the tubes. While the germ cell is ripening certain changes take place in the

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mucous membrane of the uterus: it swells, preparing to accept the fertilised ovum (or egg). Should no fertilisation occur the swollen mucosa sloughs off, and this is accompanied by moderate bleeding—the menstrual flow. The ovary has another important function besides generating germ cells; the female sex hormone, folliculin (or estrone) is produced in it and delivered through the bloodstream to all the tissues of the body. This hormone is an important factor in maintaining the normal functions of the organism, particularly during pregnancy.

Knowledge of the purpose of every organ, of its structure and function, makes understandable the hygienic requirements that arise at various periods of the life of girls and women.

Hygiene of the newborn girl baby resolves into proper hygiene of the external sex organs which are washed with clean absorbent cotton dipped in boiled water; the cotton is passed lightly from front to back, to avoid spreading any infection from the rectum.

To avoid concentration on the sex organs (to which all children of 4-5 years tend) the private parts of little girls of this age should not be washed separately; the child should be showered (or water poured over her), or she should be given a warm (but not hot!) sit-bath in a small clean basin specially assigned for this purpose.

All other rules of hygiene in the care of both boys and girls will be set forth in a subsequent chapter. However, certain specific points pertaining to girls must be remembered. Thus, particular care must be taken to avoid worm infestation, particularly with pinworms; the latter, emerging from the anus, may crawl to the external genitals, causing itching and restlessness, provoking the little girl to handle herself and push various small objects into the vagina that cause inflammation and may even call for surgical removal. The itching in the vagina and external genitals may lead to masturbation. Another point to take into account is that in childhood the vaginal mucosa is very susceptible to certain diseases, gonorrhea, trichomoniasis, moniliasis, etc. To avoid these infections the little girl must have a bed to herself and, of course, her own bedclothes and towel. It is not advisable to permit a little girl to sleep with

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her mother or some other woman, even if they consider themselves healthy, as they may be germ-passers, and an infection harmless to the grown-up woman may cause an acute disease in the little girl. Any vaginal discharge in a girl-child calls for prompt pediatric examination.

Air, sun, water, and physical exercises are just as salubrious for girls as for boys; girls have just as much need for strong muscles, agility and sturdiness, they should be able to swim and row, and go in for other forms of sports. However, any romping associated with climbing trees and fences must be strictly forbidden as it is easy for a girl to injure her sex organs while doing so, and such injuries leave scars that may subsequently become an obstacle to sexual intercourse or childbirth.

In combating child morbidity the specific danger to girls of certain diseases must be taken into consideration. Thus, rickets cause changes in the skeletal system that may end in deformation and constriction of the pelvis, and this may interfere with bearing a child in later life. Acute infections of childhood, notably scarlet fever and diphtheria, may cause scaring of the vagina and affect the normal development of the internal reproductive organs, subsequently leading to barrenness. Consequently, little girls must receive particular protection against these diseases; the child must be taken to the children's health centre regularly, inoculations must be done on time, and all the instructions of the local doctor must be followed.

General hygiene is very important for little girls when they attain the school age. The schoolgirl should keep to a regular schedule, go to bed on time, not leave her homework for the evening, not sit late watching the TV programme. It is highly important for girls not to remain too long in cramped positions, bent over their desks or tables, as such bad posture may lead to deformation of the spine and pelvic girdle. The furniture both at home and in school should be adapted to the child's stature.

Little girls should be taught not to retain the bladder and bowel contents for long; they should be encouraged not to be ashamed of asking to go out during lessons. Inhibition of the natural functions may cause *uterine recurvation and other changes in the visceral* organs.

Sexual maturation—adolescence—is an extremely important period of life. The menses usually first appear between the ages of 14 and 15. The first menstrual period may frighten a sensitive adolescent girl, therefore it is wise to have a tactful discussion of the matter with the child at the time the puberty signs first appear; she should be told of the coming changes in her body, and that soon she will have a menstrual period; she should be provided with a belt and napkins and taught to use them. The best napkin is one made of absorbent cotton wrapped in gauze and attached to the belt by means of a gauze band. This napkin must be changed at least twice a day, or oftener, depending on the volume of blood discharged. The used napkin should be burned. During the monthly period the body clothes should be changed more frequently, and strenuous physical exertions avoided; at gym lessons the girl should not jump or run, nor should she dance, ride horseback or cycle. The feet should not be chilled, nor is it permissible to sit on cold stone, or bathe in the river or sea. Overstrain and fatigue should be avoided.

Although the menstrual periods start at 14-15 years, the body is not really fit to bring forth a normal infant before the age of 18. Hence Soviet law does not permit young girls to become married before this age. If the girl's nutrition is poor during the years of maturation (from 14 to 18), if she has to work too much, if she follows no regular schedule and is often ill, her general and sexual development are retarded, and this may subsequently cause grave abnormalities in the sexual sphere. The age of puberty and maturation—adolescence—is a crucial point in a girl's life, and observation of hygienic rules are positively imperative at this time.

The next milestone in a woman's life is marriage, the beginning of sexual relationships. Here it should again be emphasised that for the offspring to be healthy both parents have to be healthy, and not the mother alone. It is therefore very important for both young men and girls to realise the need for a pre-nuptial medical examination. Any disease revealed at this examination must be cured before the marriage takes place. Monogamy is a salient factor in the health of the population at large. Such marriages are conducive to the peacefulness that is equally necessary for having and bringing up children and for creative work; irregular sex life is a factor that disables the woman and her children both physically and morally.

Marital relations should also follow certain hygienic rules. First of all sexual intercourse when drunk or ill should be avoided for the sake of the future child. A too intensive sexual life undermines the potency and health of both husband and wife. Intercourse should be excluded during the monthly period.

When it is undesirable to have children contraceptive measures should be taken, as induced abortions are very harmful and may have grave after-results—inflammatory diseases, irregular menses, barrenness. The best contraceptive agents are cervical pessaries or soft rubber diaphragms that cover the mouth of the uterus, in combination with chemical contraceptives. There are also other methods for preventing conception. The frequently practised method of incomplete coitus is harmful for both spouses.

The selection of the most suitable contraceptive is an individual matter and should be made with the help of an obstetric and gynecology specialist at the women's health centre.

All questions concerning marriage hygiene and female hygiene in general should be discussed by the woman with her local doctor at the women's health centre.

PREGNANCY

Pregnancy is a natural and desirable event for any woman brought up properly in girlhood, happily married and normally occupied at work. But even if a woman is unhappy in her marriage she possesses an inherent maternal instinct, and it is only morally deformed people who do not wish for children.

Although gestation is a natural physiological process it sets high demands on the woman—this period is, as it were, a test in life she has to take. The process is accompanied by a reconstruction of the entire system, it reveals the physical and spiritual powers of healthy women and shows the weak points of women who deviate in any manner from normal. In the latter pregnancy may be complicated by various ailments: at the beginning by vomiting, indisposition and depression, in the later half of the pregnancy by elevation of blood pressure and edema, the so-called toxicosis of pregnancy that may lead to premature delivery, stillbirth and a severe disease in the mother, eclampsia. However, many cases are known when woman's ailments do not develop during pregnancy, but even take a turn for the better. This is true of certain gynecological disorders, neuroses, and even some forms of the hypertensive disease. The advisability of retaining the pregnancy in case of illness is determined by the physicians at the women's health centre. Therefore a woman must visit the local health centre at the very beginning of her pregnancy, directly after cessation of the menses, to be thoroughly examined by specialists; all their recommendations must be strictly followed. Healthy women are only subject to some slight inconvenience during the first weeks of pregnancy—nausea, weakness, lack of appetite. And at the same time they experience a peculiar contentment, a concentrated serenity and feeling of fullness of life. Much depends on circumstances: a woman who loves and is loved and wants to have a child by the man she loves has an easy pregnancy, while one who lives under bad conditions and is unmarried frequently feels greatly depressed and very ill. However, such cases are rare. In the overwhelming majority of cases pregnancy is attended by pleasant emotions.

To comprehend the necessity for taking various hygienic precautions during the different phases of pregnancy one must understand the entire process of conception, gestation, and childbirth.

Conception occurs in the following manner: the male reproductive cells—the motile spermatozoa—are deposited in the vagina of the female during coitus. Within 4 or 5 hours after intercourse some of them already penetrate through the canal in the cervix of the uterus into the uterine cavity, from whence they work their way upward through the oviducts toward the female cell that is still in the ovary or on the way from it—near the uterine tube or already in it. When the spermatozoa meet the ovum they encircle it and strive to penetrate its membrane.

As soon as one spermatozoon penetrates the membrane the viscidity of the latter increases, making it inaccessible to the other spermatozoa, and they perish. The now fertilised ovum continues its journey along the oviduct in the direction of the uterus; after passing into the uterine cavity the ovum attaches itself to the mucous membrane (or burrows into it) in the upper part of the uterus and commences its development. When conditions for conception are unfavourable, or in cases of morbid states of the uterine mucosa (a frequent result of previous abortions) the fertilised egg may either perish immediately, or its development may commence in the lower portions of the uterus, leading to an abnormal position of the fetus—presentation of the placenta (the afterbirth), a severe complication during labour.

Division of the ovum and formation of the tissues and organs of the fetus occur in the first weeks of gestation. Any disease of the future mother at this time, inadequate nutrition, absence of a consistent regimen, certain drugs—these are all factors that may disrupt the process of formation of the new organism and lead to the destruction and resolution of the fetus, or to a miscarriage, or to the formation of abnormal organs (deformities). It is namely during the first 8-10 weeks of gestation that abnormal development or destruction of the fetus is observed.

By three months of pregnancy the placenta (the afterbirth) has already been formed; the fetus is now securely attached to the uterine wall by means of the placenta, and thus the danger of a miscarriage decreases. By this time the resistance of the fetus to harmful agents increases, consequently, the danger of abnormal development subsides, since the principal tissues and organs are already differentiated. Consequently, the first 10-11 weeks are the most crucial period in pregnancy.

As the fetus grows the dimensions of the uterus also increase, partly owing to distention of its walls and partly owing to an increase of muscular fibres and their thickening. The developing fetus remains in the ova, surrounded by thin, strong sheaths that shut it off securely from the outer world. The cavity of the ovum is flooded with the amniotic fluid (the "waters") in which the fetus moves around freely and grows, and which protects it against compression, jolts and bumps from without. The woman who is carrying her first child first senses movement when she is 20 weeks pregnant, a woman who has already had children—two weeks earlier.

The fetus is connected with its mother through the placenta to which it is joined by a cord containing the umbilical blood vessels. Through these vessels the maternal organism supplies the fetus with all necessary nutritive elements. The fetal waste products are delivered through the cord into the mother's blood. Thus a constant exchange of substances takes place between the mother and her future child. The maternal body does double duty. During pregnancy the volume of the mother's blood increases by almost 21 per cent, her blood vessels dilate, gas metabolism intensifies, the work of the kidneys increases; the woman requires a greater amount of nutritive substances and oxygen, all her organs are under a great strain. All these points must be taken into consideration when planning a schedule for the pregnant woman, a matter that will be dealt with later. The duration of pregnancy is roughly 9 months, i.e., 40 weeks counting from the first day of the last menstrual period. However, only 3 or 4 of every 100 women are brought to childbed in exactly 40 weeks. The others are confined either earlier or later, deviations being within the range of two weeks, occasionally even more. Therefore, not all pregnant women get the 56 days prenatal leave they are entitled to, even if the doctor does give them their pregnancy leave certificate at exactly 32 weeks. This explains the majority of so-called "late" and "early" confinements observed in all health centres.

The variations in the duration of gestation computed according to the above method depend to some extent on the date of fertilisation which may take place any day between two menstrual terms. A woman who has regular marital relations is herself not aware of the day she conceives, be it directly after the last menses (this occurs but rarely) or just before the awaited but missed period. Thus the difference between the term of delivery as computed by the menstrual periods and by what actually occurs may be as great as 3-4 weeks. However, observations of cases when the day of the impregnating intercourse was known definitely (for instance, if this intercourse was the only one) have shown that full-term infants can be born on the 264th, 295th, or even 214th and 320th days after intercourse. Science can as yet offer no precise explanation for these individual deviations, and therefore, it is impossible to foretell the precise date of confinement. Women should know this in order to be careful in the last month of pregnancy, not to go on any distant trips, and be ready at any time for childbirth.

HYGIENE OF PREGNANCY

Generally speaking, a healthy woman should live her normal life during pregnancy, provided, of course, that there are no harmful elements in it. But she must be particularly meticulous about the cleanliness of her body and clothing, about food, work, and rest schedules. She should always remember that from the very first day of her pregnancy she is responsible for the life and health of her future child.

The act of conception is in itself one of the crucial moments that define the development of the fetus and influence the subsequent life of the human being-to-be.

A fetus that has been conceived while its parents were in a state of alcoholic intoxication, or during an acute or severe chronic disease, or during a grave nervous condition, may develop abnormally or perish in the first phases of its development, be born prematurely, or develop some congenital developmental defect, particularly of the nervous system. Consequently, sexual intercourse should be avoided when even one of the partners is in such a state.

As we have already noted, the most responsible months are the first three months of pregnancy, when the delicate microscopic cells of the embryo are dividing and grouping into the organs of the future baby. Any abnormality in the maternal organism may be reflected in this process, leading to severe consequences. This is the period during which the most intensive reconstruction of the female organism is taking place, when the woman is adapting herself to the new conditions of "twosome" life. Therefore, in the first three months of pregnancy the expectant mother is in need of particular care and peaceful conditions, she should be exempted from hard physical work and mental overexertion, sports and dancing should be excluded altogether for this time.

As soon as a woman finds she is pregnant she should apply to her local women's consultation centre, where she will be thoroughly examined by specialists. Should this examination reveal some disease the appropriate measures will be decided on by the doctor. In these first months the woman should avoid catching cold or, particularly, any infectious disease, such as influenza and sore throat; she should avoid crowded places. It is absolutely forbidden to take any medicines without consulting the doctor, as both diseases and drugs may effect the development of the embryo at this period and lead to irreparable consequences.

Sexual intercourse is positively impermissible during the first months of pregnancy, as the excitation induced by this act may have a harmful effect on the fetus, or may provoke a miscarriage. A peaceful and normal life during these crucial months of pregnancy is a most important condition for the birth of a healthy, normal baby.

Bodily cleanliness is important throughout pregnancy. The entire body (or at least the breasts) should be sponged daily with room-temperature water. The woman should take a shower at least once a week, or wash in a not-too-warm bath-house. The female organs should be douched twice a day with boiled water.

Care of the skin is particularly important during pregnancy because the skin facilitates the work of the kidneys, the strain on which is very high at this time.

River or surf bathing should be forbidden as they are intensive skin irritants, and this may be harmful for both mother and fetus. From the very first days of pregnancy the expectant mother should get as much fresh air as she can, since oxygen deficiency (owing to staying long in stuffy, poorly ventilated premises) may cause various complications, even death of the fetus. It is best to spend several hours a day out of town, or at least in a park, as the air in the streets of a city is only slightly charged with the atmospheric electricity (negative ions) so necessary during pregnancy. The rooms at home should be aired throughly twice a day.

Exposure to direct sunlight should be restricted, no sunbathing is permissible; however, air baths in the shade in the summer months are widely recommended, but the body should be gradually trained to these exposures. If total air baths are not always feasible it is at least possible and absolutely necessary to expose the breasts to the air for at least 15-20 minutes daily; in the cold seasons this is done indoors, in the warm months—in the open air. This latter procedure hardens the nipples, preventing subsequent nipple fissures when the child is breast-fed. Flat nipples should be cautiously drawn out regularly, after first carefully washing the hands.

A schedule of the daily routine should be worked out from the very beginning of the pregnancy with the assistance of the local obstetrician, and should be adhered to strictly. The principal points of such schedules are getting up and going to bed at definite times and sleeping no less than 8-9 hours. Meals should be taken at definite hours, preferably 5 times a day in small portions, to avoid overloading the stomach. It is imperative to allot three hours in the daily schedule to being outdoors, and to keep to the schedule. It is advisable to pin it up on the wall so as not to forget about it, and so that all the other members of the family should help follow it.

The pregnant woman should wear loose clothing that does not hamper her movements or compress her abdomen and breasts. Brassieres should be worn on wide straps, and made to fit so that they support the breasts, but do not compress them. Garters for holding up the stockings should be attached to buttons sewed to the brassiere. Round garters are positively forbidden, as they check blood circulation in the lower extremities, causing dilatation of the veins, a condition to which pregnancy itself is conducive.

Beginning with the 28th week of gestation it is a good idea to wear a made-to-order bandage which supports the abdomen and does not let the abdominal walls stretch too much. The bandage should be put on whilst in a supine position, and it should not be laced too tightly (the local obstetrician teaches the woman how to do this).

Flat-heeled shoes are advisable, particularly during the late months of pregnancy when the centre of gravity shifts forward and it is more difficult to balance on high heels, making walking a strenuous matter.

The pregnant woman should take wholesome food containing enough proteins, carbohydrates, fats, vitamins and mineral salts. During the first months a woman often has an urge to eat acid or salty things; there is nothing bad in this, but it must not be overdone. In the last months of pregnancy all pungent and salty food, smoked fish and meat, and tinned food should be abandoned. The only thing that is absolutely forbidden from the very beginning is alcohol in any form—whisky, wine, beer. During the second half of pregnancy, particularly in the last two months, proteins derived from meat should be restricted and replaced by dairy food proteins (milk curds). The diet of the pregnant woman should be supervised by the local obstetrician. It is recommended to include pressed milk curds (cottage cheese), cream, and bland cheese in the daily diet, and to drink half a litre (one pint) of milk. Towards the end of the pregnancy liquids should generally be restricted to a total of no more than 6-7 cupfuls a day. Besides milk, fruit juices are a good beverage. Salt, as we have already said, should be limited.

Carbohydrates are positively necessary in the diet of pregnant women; besides their nutritive function, these substances also possess the property of inhibiting processes of excitation in the brain cortex, and this is very important for normal gestation. Carbohydrates are contained in vegetables, fruits, bread. Brown bread is better than white, as it contains vitamin B_1, deficiency of which causes nervous system disorders in the pregnant woman and weak labour activity at childbirth (buckweat and barley have high vitamin B_1 values).

Vitamins occur in vegetables and fruits, but in the winter and spring months, when there are less of these products and they contain less vitamins, dietary supplements should be provided in the form of vitaminised syrups or pills containing all the necessary vitamins—A, B, C, D, E. Vitamin deficiencies cause complications during pregnancy and diseases of the fetus, miscarriages, premature births—particularly in vitamin E deficiency.

Mineral salts also occur in vegetables, fruits, and milk; however, occasionally the doctor will prescribe additional calcium, an element needed for building the bones of the fetus. Women usually feel the calcium deficiency themselves, having an urge to eat chalk. Of course, this must not be done, and the doctor's advice should be sought in such cases.

To prevent the appearance of rickets in the child the prospective mother should take fish liver oil or vitamin D in the last months of pregnancy (vitamin D only when prescribed). A course of ultraviolet radiation is also very salubrious.

Fats, particularly in the last months of pregnancy, should not be taken in excess.

In general it must be known that a diet containing too much starch (grains) and fats may result in excessive weight of the future baby, making it difficult for him to pass through the birth canal. It is difficult to say exactly how much a pregnant woman should eat a day: this depends on her stature, age, on the stores her body has accumulated, on the manner of work she does. The only recommendation is not to "stuff" oneself with food at table, but to finish a meal with a feeling that some more could have been eaten although hunger has already been appeased.

The nutrition of the pregnant woman, as, indeed, her entire life and behaviour, should be governed by the interests of the future child; although the nutritive substances delivered to the fetus from the mother's bloodstream have already been digested by the maternal organism, still the mother should take care to eat only food of good quality, remembering that many toxins (poisons) and germs are capable of penetrating through the placenta and that they may have a morbid effect on the fetus.

The teeth call for special attention during pregnancy since they may be depleted of the calcium needed for building the baby's bones, especially when the mother's food does not contain enough mineral salts; this calcium depletion makes the teeth subject to caries, therefore the pregnant woman should visit her dentist regularly, have all her bad teeth fixed, and the decayed ones extracted as they may be a source of infection during the confinement period.

Physical exercises are highly important for the normal progress of gestation. During the first half of the pregnancy the woman should do all the exercises transmitted over the radio, except jumping and running. If she did not do morning exercises previous to pregnancy it is advisable for her to do them now, but only the ones that are not difficult; even the most simple set of exercises is beneficial: stretching the body, lifting the arms and then spreading them backward, and exercises for the abdominal wall (from a supine position with the legs stretched forward sit up supported by the hands, then lie back again). Exercises for the muscles of the bottom of the pelvis are done in a supine position, the legs straightened out, toes pointing forward; the pelvic part of the body is lifted, the buttocks are pulled in, then the pelvis is let down again and the buttocks loosened. Such exercises may be done up to nine times daily during the first 32 weeks of the pregnancy, and 6-7 times in the two terminal months. Even such brief exercises, if they are done regularly, are conducive to strengthening and hardening the body—particularly the abdominal muscles, and this will prove useful during labour. However, the best adviser is the local obstetrician, as he knows which exercises are best in each individual case.

Women should not leave their usual work during pregnancy, if their occupation does not comprise elements such as chemical harmfullness, vibration of the body (work on motor-buses), intensive strain on the lower extremities (pedal-run sewing machines), climbing heights (electricians), lifting heavy weights. The health centre must know the specificity of all occupations and transfer the pregnant woman from work that is too strenuous. Other types of work must be considered individually for every given case, depending on the health of the prospective mother. Night work and any overstrain is positively harmful. It is important for the women themselves to be aware of this, and to see to it that these rules are kept. Work should be continued, of course, and physical exertions are also necessary, as well as long walks, since a sedentary and inactive life during pregnancy may lead to weak labour activity, to asphyxiation of the fetus, or to postponed labour, which is also very bad for the baby. But no work should be done that is connected with the application of pressure to the abdomen or with lifting heavy weights, or any overstrain in general, physical or mental. Work should alternate with rest and recreation. It is advisable to lie down for a rest for half an hour or an hour in the middle of the day, or to sit down with a book in the fresh air. Outings to theatres and concerts are permissible no oftener than once a week, preferably matinees. It is not recommended to go to the cinema, particularly in the late months of pregnancy, as it is bad to sit in stuffy premises in streetclothes.

An important factor in the normal progress of pregnancy is good sleep. As has already been mentioned, a pregnant woman should sleep no less than 8-9 hours in 24; immediately upon going to bed she should fall into a dreamless, sound sleep. Scientific research has shown that women who have slept enough and soundly experience uncomplicated labour and their babies are stronger and quieter. Naturally, good sleep depends on good health, but a healthy woman can disturb her sleep by overstraining herself, or by a heavy supper before going to bed, or by sleeping out of hours in the daytime. Resolute measures should be taken against insomnia, first of all by strict adherence to the daily schedule, physical exercises, and a walk before bedtime; occasionally a drug prescribed by the doctor may be taken. Sleep is the best way of resting the body as a whole and the nervous system in particular, of preserving strength for the intensive calls made on it by the act of childbirth.

Observance of all the above rules for work and rest, as well as sound sleep, proper food, and pleasant family relationships are conducive to good health of the prospective mother, proper development of the fetus, and normal delivery of the new human being.

At 32 weeks of pregnancy the local obstetrician gives the pregnant woman her pre-confinement leave certificate. During the two remaining months the future mother should attend an additional cycle of lectures, the so-called psychoprophylactic preparation for childbirth. The purpose of this preparation is to help the woman work out a proper attitude toward childbirth as a natural physiological process, to dispense with her groundless fears, and to teach her how to behave during labour; this is attained by a psychological approach and by certain instructions. The knowledge gained by the women during these lectures yield extremely good results during labour: childbirth complications are very rare among women who have been thus prepared, their labour is shorter, their babies are healthier, and the labour pains are strikingly alleviated. These results have already been tested in tens of thousands of obstetric cases. The psychoprophylactic method proposed by Soviet obstetricians has been taken over and successfully practised in other countries, and it is definitely a great boon to women. Besides regular attendance of lectures in preparation for childbirth the woman in these two last months of pregnancy must also go through a course of sunlamp radiation treatment and aero-ionotherapy wherever this is possible. It is also necessary to visit the local pediatrician who will in the future be the baby's doctor: he will advise the expectant mother what to prepare for the child and will give first instructions on infant care.

CHILDBIRTH AND THE POST-CHILDBIRTH PERIOD

The causes contributing to the onset of labour are not known precisely. Some part is played by the endocrines, some by the dimensions of the fetus: the endocrine hormones increase the contractility of the uterus by the end of pregnancy, while by this time (nine months) the fetus becomes so large that its pressure on the uterine walls stimulates contractions in this organ. The stimulations induced by the fetus are transmitted to the central nervous system, affecting the state of the cerebral cortex so that it issues an "order" for the onset of childbirth.

The approach of childbirth may be felt as early as a month prior to the event: the abdomen relaxes owing to the descent of the uterus into the pelvic cavity, the diaphragm is relieved of pressure, breathing becomes easier. The woman experiences a sensation of heaviness in the small of the back and in the lower abdominal region. Occasionally pains are felt in the abdomen, the womb becoming hard to the touch. These signs are the precursors of labour. True labour commences with contractions; the woman feels a pressure in the abdomen—something contracts, and in a minute relaxes. However, in another 25-30 minutes the "contraction" is repeated—this is an incomparable sensation of uterine contraction, as if something were bunching itself up, making ready to jump. This is not pain, and yet it may be called pain, particularly if the woman has little medical knowledge and, in addition, has been frightened by old crones and neighbours whose deliveries may have been badly managed or irregular, and therefore truly painful. A woman who is frightened and medically ignorant is ready to take any unusual movement in her body for pain. But the difference between pain as a sign of a pathologic condition in the body—of disease or of a wound—and labour "pain", or pangs, is immense. The pain felt in pathologic conditions, at the onset of some disease, is a signal of distress, a warning that the body is in danger and something must be done, when and how the disease will terminate is not known. Pain is a protective signal in all living creatures. Labour pains are an absolutely different thing. They are not signals of distress, but signals of joy. They, as it were, say: a baby is arriving, prepare to welcome a new member of society. This is happiness for mother, father, for all relatives and friends, and for the country in general.

This "pain" also warns that it is time to set out for the maternity hospital, not to be late. Everything is in readiness there for the new child.

The period of labour is divided into three stages: dilatation, expulsion and post-parturition. The duration of the first stage (dilatation) in a woman bearing her first child (a primipara) is approximately 16-18 hours, in multiparas (a woman who has already borne one or more children) it is from 6 to 8 hours. This must be taken into account when leaving home for the maternity hospital. If the contractions (labour "pains") are occurring over intervals of 30 minutes the primipara does not have to hurry, the womb is just beginning to open, making way for the baby. But if the pains are repeated every 10-15 minutes it is high time to go. This also depends, of course, on the distance to the maternity hospital.

The multipara should not delay going to the hospital as her labour may be over very quickly and she may give birth in the street on the way to the hospital. It is better to make haste.

Everything that will be needed in the hospital should be prepared beforehand. It is permitted to take an apple and a small bar of chocolate to be eaten during labour. The other things can be brought by members of the family afterwards.

In the maternity hospital the parturient woman (the woman in labour) is received by a midwife who examines her to discover whether any symptoms of infection are present (rash, sore throat, etc.), measures the blood pressure, weighs the woman, and shaves the pubis. After this the patient is examined by an obstetrician, takes a shower, and is led to the delivery ward. In these rooms everything is white, clean, peaceful. The woman lies down on a high bed and commences her work—her labour. Yes, childbirth is a physiological process, but it is associated with a great expenditure of strength and energy, and it is facilitated by being accustomed to physical labour and exercises.

During the labour pains or contractions the woman lies on her back and performs the manipulations she learned in the health centre during the psychoprophylaxis lessons: light stroking of the abdomen, deep breathing, pressure on the iliac crests. This distracts attention from painful sensations if they are present and is conducive to dilatation of the uterus and propulsion of the fetus. As soon as a contraction is over the parturient woman should turn on a side and relax completely, to give her body a rest. While the contractions are still not very frequent she should try to sleep in the intervals between them.

Thus, imperceptibly, in labour and self-observation, the first stage of childbirth goes by. Usually the amniotic sac breaks at the end of the stage of dilatation, and the "waters" are discharged. Should the sac not break at this time it is lanced by the obstetrician or midwife. The next stage is that of expulsion. New sensations appear—a dragging of the pelvic organs (the bearing-down pains), and an urge to strain. Up to this stage the principal site of labour was the uterus; its contractions were conducive to dilatation of the cervix and progression of the head to the pelvic floor; but now all the muscles of the abdominal wall, legs, arms, and diaphragm—that is, actually of the whole body—are mobilised. The pains caused by the distention of the vagina and perineum during the emergence of the head are quite tolerable, and some women feel no pain at all. At this stage the woman in labour should grasp the rails at the sides of the bed or special reins, or her legs under the knees, close her mouth and bend her chin to her chest and in this position strain to expel the baby. This is a difficult part of labour, calling for great exertions, but its duration is only between half an hour and two hours, and any healthy woman can easily cope with the task. On the order of the midwife the parturient woman stops straining and commences breathing deeply and rapidly, in order to give the midwife the opportunity to cautiously deliver the head and shoulders of the infant without rupture of the vagina or perineum. And immediately after this the mother hears the cry of her child, and experiences a remarkable sensation of lightness in her body, and of joy. After 15-20 minutes of blissful rest the woman again experiences a contraction, an urge to strain, and does not have to exert herself much to expel the last remaining "appendage" of the infant in the maternal body—the placenta, or afterbirth.

A sensation of profound physical well-being permeates the being of the mother. Her labour is over. She has performed her duty. The world around her seems so replete, and life so long, extending scores of years ahead, so full of interest, so vast.

The happy mother can now sleep.

The birth of a healthy baby and the health of its mother call for the observation of certain rules of conduct and regimen during pregnancy and childbirth; however, certain rules in the post-childbirth (puerperal) period are just as important. A woman may have a normal pregnancy and delivery, and then ruin her own life and the life of her baby.

In this period cleanliness is of paramount importance. In the maternity hospital care of the genital organs (douching with a mild disinfectant) is the duty of a midwife. However, the child-bed patient herself must also be careful about personal hygiene.

The hands deserve particular attention as through them infection may be transmitted to the genitals, the breast, and the baby. Therefore they must be kept scrupulously clean, and no dirty work should be done at home, or, if it cannot be avoided, such work should be performed in gloves during the first weeks following childbirth, and the hands washed afterwards with soap and a nailbrush. The hands should be washed with soap and dried on a clean towel morning and evening, before each meal, after visiting the toilet, and, most carefully, before nursing the baby or expressing milk from the breast. After the hospital, at home, the genitals should be douched twice a day with boiled water, and the hands thoroughly washed before and after this procedure. Daily ablutions to the waist are obligatory. A shower may be taken a week after dismissal from the hospital, but no bath or visit to the bath-house are permissible earlier than 4-5 weeks after confinement. Since vaginal discharge continues for 3-4 weeks, a waterproof pad should be placed under the sheet (particularly during the first two post-delivery weeks) and a small sheet or napkin over the large sheet. The underclothes should be changed at least once in five days. During the first two weeks a pad of absorbent cotton wrapped in gauze should be worn (or a napkin made of a piece of well-washed and ironed old linen) when the woman is out of bed.

Non-observance of cleanliness in the post-confinement period may be the cause of inflammation of the internal reproductive organs, of mastitis, of skin conditions or even of a septic disease in the child.

Besides cleanliness, an important factor in the post-confinement period is the condition of the nervous system: the mother must be shielded against all manner of strong emotions and irritation, she herself should strive to be calm, as all tenseness and anxiety affect the quality of her milk and may even lead to its loss, a disastrous thing for the baby.

In the absence of any complications during pregnancy and childbirth the patient may turn over on her side on the very first day after delivery, on the second she may sit up, on the third walk. Earlier ambulation, and particularly the carrying of anything heavy, may cause a sinking of the vagina and uterus (prolapse) and this will subsequently result in gynecological trouble. Light physical exercises are salutary, beginning with the second post-confinement week, as they improve the general condition and are conducive to the retrogressive development of the uterus.

In so far as in the Soviet Union the overwhelming majority of village women and all without exception city women have their babies in hospitals, they receive instructions from their doctors on post-confinement behaviour, depending on their health.

The mother's nourishment after she has borne a child should be of full dietary value, just as before childbirth. However, the constituents are changed. No restriction is now put on meat, salt, and liquids. Quite the opposite, the volume of liquids—milk, fruit juices—should be enlarged (although not to excess). Vitamins should be taken in large quantities in fruits and vegetables. And, just as during pregnancy, all and any alcoholic beverages are forbidden, as well as certain condiments, such as mustard, vinegar, pepper.

The general rule for intake of food remains—do not eat in excess, do not overstrain the stomach, but do not starve yourself.

A regular regimen is just as important after confinement as before. A strict schedule must be followed for going to bed and getting up, for nursing the baby, taking meals, going for walks, bathing the baby and taking it out. A normal regimen is conducive to normal functioning of the bodies of both mother and child. The observance of a strict regimen is the first point in training the infant, in the institution of definite conditioned reflexes conducive to the baby's peacefullness and normal development. And this is the mother's main goal and her happiness.

The breasts require particular attention. They must be washed or sponged daily, with soap and water; before nursing the baby the nipples are swabbed with sterile absorbent cotton dipped in a weak solution of boric acid or just pure boiled water. The nipples should not be touched with the fingers. If the baby is a lazy sucker and does not deplete the breast of milk the remaining amount must be expressed manually, stroking the breast in the direction of the nipple, but not squeezing it. Cracked nipples must be treated by the doctor immediately the condition develops; the most scrupulous cleanliness is necessary, as the penetration of any infection causes mastitis.

Medical advice should also be sought in the event of a bloody vaginal discharge, of any elevation of the temperature, or of abdominal pains appearing. In uneventful cases the new mother should visit her local obstetrician approximately one week after she has been dismissed from the hospital, and these visits should be repeated regularly for a period of eight weeks.

Sexual intercourse may be resumed no earlier than 6-7 weeks following childbirth, and only after the doctor has given his permission. The doctor will at this time instruct his patient on contraceptive agents, since conception may occur even during lactation, and this is undesirable, for the body should rest for at least a year and a half.

Before resuming work after childbirth the mother is again examined by her doctor, who advises her whether she should remain on her former job or arranges for her to be temporarily transferred to more appropriate work. So we see that the women's health centre must be visited regularly in the post-delivery period.

THE WOMEN'S HEALTH CENTRE

The women's health centre is one of the outstanding achievements in curative and preventive medical services; this medical institution only appeared under Soviet power, and it is vivid proof of the care of the state for mothers, a recognition of the great role women play in the construction of the new society.

The activities of the women's health centres include prevention of women's diseases, ensuring women healthy motherhood and the birth of healthy children.

The work of these centres is built on a local district plan, that is, a definite territory with a definite population number is served by one obstetrician-gynecologist who is responsible for the health of the women in his district. This doctor gives the population sanitary instruction, explains to the women the importance of the health centre and the need for visiting it.

Every pregnant woman must report to the health centre as soon as she is certain she has missed her regular period, and these visits must be kept up regularly throughout pregnancy. Every woman, notwithstanding her age, should be examined at the health centre upon the first appearance of symptoms of gynecological disorders.

To facilitate annual examinations of women the various institutions and enterprises organise medical examinations of their employees; women who do not work are invited by their local doctors to the health centres, or, still better, they should go there without being invited.

The purpose of these annual examinations is to reveal the very first signs of gynecological disorders and to apply corresponding health-promoting measures. Owing to the enaction of prophylactic measures the incidence of cancer has gone down sharply, and cases of neglected malignant diseases have been almost completely excluded. Every woman must understand the importance of the annual gynecological examinations, and must not fail to have herself examined.

Women afflicted with gynecological diseases—inflammation of the uterine appendages, disorders of menstruation, barrenness—receive adequate treatment at their health centre; they are hospitalised when necessary, are transferred to easier work until recovery, or are given a special spa health-card on the basis of which the trade union provides corresponding health resort accommodation. At the health centre the woman can get advice on the most suitable contraceptives when she is not in a position to have a baby. Friendly advice is given at the health centre on any questions pertaining to the woman's health, her domestic or occupational problems; the advisers are her local doctor and the lawyer on the staff of every health centre.

The services of the health centre are of immense importance to the pregnant woman. Timely examinations and regular check-ups throughout the pregnancy period are a safeguard against various disorders, and thus the health centre helps the woman to bring forth a healthy, full-term infant. The obstetric nurse visits the pregnant woman at her home and checks up on her schedule.

A specially appointed lawyer on the staff of the health centre protects the rights of the mother.

Everything at the consultation centre, beginning with the premises and equipment, is conducive to acquiring necessary hygiene knowledge. The waiting-room walls carry expositions, drawings, illuminated slides, posters, all devoted to daily routine and the battle against diseases, baby and child care, the harm of abortions. Popular booklets on medicine lie on the tables. The district doctor holds sessions on various medical subjects and heads special "motherhood schools" where systematic instruction is given on the hygiene of pregnancy and baby care. During the last two months of pregnancy all pregnant women are given instruction on preparation for natural childbirth (this has already been spoken of).

What we have here said shows the importance of the women's health centres and the prominent part they play in the life of women. However, to ensure the proper functioning of the health centres the women themselves must visit them regularly, particularly during pregnancy, and they should know and trust their local doctor, and understand that he is their first and constant friend and adviser.

LAWS PROTECTING MOTHERS' RIGHTS

Women in the Soviet Union enjoy equal rights with men, as declared in Article 122 of the Constitution. Moreover, women have additional rights and privileges, in so far as they have additional duties—bearing, nursing, and bringing up children.

As we have already mentioned, the staff of the women's health centre includes a specialist on social and legislative matters (a lawyer); his duty is to assist the woman by acquainting her with Soviet legislation on mother and child rights, as well as with the operation of these laws. He gives advice (free of charge, of course) on any and all questions concerning working or living conditions of prospective and nursing mothers—transfer to a more suitable job, recovery of maintenance money from the father, receipt of social security grants, improvement of unfavourable living conditions, etc. The lawyer, together with the district doctor, helps the woman obtain everything she is entitled to by law.

We shall here set forth only the principal points on the rights of mothers.

In accordance with Article 96 of the Labour Code pregnant women are exempt from night work from the very beginning of their pregnancy. After 16 weeks of gestation no overtime is permitted. Should the work ordinarily performed by the pregnant woman be contraindicated during pregnancy she must be transferred to a more suitable job (on the conclusion of the health centre doctor). On the new job she receives a salary equal to her mean earnings during the last 6 months of her former occupation (Article 132, LC of the R.S.F.S.R.).

A pregnant woman may be dismissed from her job in exceptional cases, and only with the permission of the labour inspector. Refusal to employ a woman because she is pregnant is a criminal offense.

In accordance with a Decree of the Presidium of the Supreme Soviet of the U.S.S.R. issued March 8, 1956, working women get a 112-day maternity leave (56 days before and 56 days after delivery). In cases of complicated labour, or the birth of twins, the post-delivery leave is lengthened to 70 days. A decision of the Council of Ministers of October 13, 1956 permits mothers to take a 3-month vacation without pay after the termination of the post-confinement leave, and have their jobs waiting for them.

Collective farm members have maternity leaves in accordance with Article 14 of the "Rules of Agricultural Artels" (rules for managing collective farms) one month before and one month after the birth of the baby; during these months she gets 50 per cent of her average workday unit earnings.

Women employees engaged in both physical and mental work, including non-members of trade unions, have the right to paid maternity leaves independent of their service-record duration (resolution of the All-Union Central Trade Union Council of February 5, 1955). When the woman's total service-record is no less than 3 years, including 2 years of uninterrupted employment in the given enterprise or institution, she is entitled to full pay beginning with the first day of her maternity leave. Women whose service-record is shorter get three quarters or two thirds of their pay for the first 20 days (depending on the length of their employment) and full pay during the subsequent period of leave. Women whose service record is shorter than one year are entitled to two thirds of their pay throughout the maternity leave, but no less than 30 rubles. Pregnant women graduating from institutions of higher learning and assigned to positions in their special fields receive their pregnancy leave pay in the enterprise they have been assigned to work in from the day they report there, even if they have not yet begun their work.

Nursing mothers are exempt from night work and overtime during the entire nursing period. In accordance with Article 134 of the Labour Code they are entitled to an additional intermission during work for nursing their babies; the intermission is counted as work-time. If the working conditions of a nursing mother interfere with her nursing she must be transferred to a more suitable job. Should there be no other position of a similar qualification in the given enterprise the nursing mother is transferred to any suitable work, but on her former pay (this pay is determined by what the woman averaged during the last six months, not counting her pregnancy leave).

Nursing mothers cannot be refused a job because they are nursing their children, and their dismissal from work is only permitted in exceptional cases approved by the trade union organisation.

Mothers who are not married legally get monthly grants for their children until the latter attain the age of twelve years.

A mother (or father) whose monthly pay does not exceed 50 rubles is given a special grant on the birth of a child independent of the earnings of the other parent. Every mother is entitled to a grant on the birth of her third baby. On the birth of a fourth and subsequent child such mothers receive, besides the special birth grant, a monthly allowance in accordance with the "Status on Grants for Pregnant Women, Mothers with Many Children and Unmarried Mothers" approved by the Council of Ministers of the U.S.S.R., June 29, 1956 (No. 879). Moreover, a woman who has borne and raised 5 or more children is entitled to an old age pension at the age of 50 years with an employment record of only 15 years* (for other women the corresponding figures are 55 and 20 years).

Mothers who have borne and brought up 5 and 6 children are awarded "Motherhood Medals", degrees I and II. "Motherhood Glory" orders of several degrees are given to women who have 7, 8, and 9 children. Women who have borne and raised 10 children are awarded an order and the high title of "Mother-Heroine".

This is how mothers are cherished and honoured by the Soviet people and the Soviet state. Mothers are not only sacred to everybody, healthy and happy women are the safeguard and symbol of the strength and happiness of the entire nation. In the words of Maxim Gorky, "without sun the flowers do not open, without love there is no happiness, without woman there is no love, without mothers there are neither poets nor heroes".

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* The State Pension Law issued July 14, 1956, Section 2

Part Two

ANATOMY AND PHYSIOLOGY OF CHILDHOOD

THE NEWBORN INFANT

The newborn period starts at the moment the umbilical cord is tied and it continues until almost the end of the first month of life. This period is marked by certain specific features distinguishing it in many ways from the subsequent stages of childhood.

Directly after birth the newborn infant finds himself in an absolutely new environment, he must adapt himself to the new conditions; in this he has to be helped by proper care and nutrition. An understanding of the specificities of the newborn is needed for coping with this task.

An infant delivered at term has gone through a prenatal developmental cycle of 10 lunar months—40 weeks or 280 days. Newborn infants are classified full-term if their weights are no less than 2,500 g and their crown-heel length is no less than 47 cm. The weight of normally delivered infants varies between 2,500 and 4,000 g (they may be even heavier). The average weight is 3,000-3,200 g and the average length 50 cm (lengths vary between 47 and 54 cm). Premature infants are those delivered after the 28th week of pregnancy, but before term, and weighing from 1,000 to 2,500 g, with crown-heel lengths of 37 to 46 cm.

The expulsion of the fetus earlier than 28 weeks of pregnancy, or of a fetus weighing less than 1,000 g, and shorter than 37 cm is called a miscarriage.

Babies delivered at term are more resistant, more "mature" than premature infants.

The weight and length of the newborn are affected by the age of the parents (the children of very young or of elderly people frequently show smaller weights and lengths at birth). The weight and the height of the parents is also significant. Physically weak mothers may also give birth to smaller children. Poor diet and hard work during pregnancy may also affect the size of the infant.

The *skin* of the newborn infant is covered with a whitish greasy or cheesy substance (the vernix caseosa) which protects the fetal skin against the amniotic fluid in the prenatal period and which, moreover, facilitates the passage of the infant through the birth canal at delivery.

The shoulders and back of the infant are covered with fine downy hair (the lanugo), more marked in premature infants. The skin is very thin and delicate, its outer protective horny layer is underdeveloped, therefore the skin is easily injured and is susceptible to various diseases when handled neglectfully. Frequently the outer layer of the skin may slough in the first days of life, while in some infants the skin is very dry, particularly in the folds on the neck, in the armpits and the inguinal area, with a tendency to cracks. During the first days following birth the infant's skin is usually ruddy. This physiological erythema is more pronounced and persists longer in premature children. The ruddiness of the skin corresponds to the redness of the skin caused by cold in adults (a response to thermal stimulation); it is due to the immature thermoregulating functions of the newborn. Pale-pink spots of irregular size and shape, disappearing under pressure, are frequently seen on the forehead and in the back of the neck; these spots are a fine network of minute blood vessels that disappear uneventfully within the first year of life without treatment. It is not uncommon for hemorrhagic spots to appear on the skin of the face, the head, occasionally on the arms and legs or in the whites of the eyes of newborn infants who have been delivered quite normally; these spots soon disappear spontaneously, leaving no traces.

Toxic erythema is observed in almost 50 of every 100 newborn infants delivered at term. It is displayed in the form of red spots, sometimes with a firm yellow nodule in the centre, that appear in the first 5 days of life and disappear within 2-3 days without treatment. Their origin is traced to the "pregnancy reaction", i.e., the effect of the maternal organism on the fetus during the period of pregnancy. Milia of the face (particularly of the nose) of the newborn is often observed in the form of pinpoint yellowish papules caused by the distention of the sebaceous glands, particularly in the terminal period of pregnancy. These papules gradually disappear.

The *secretion of sweat* is an underdeveloped function in the newborn.

Jaundice of the newborn mostly appears on the second day of life as a more or less pronounced yellowishness of the skin and mucous membranes of the eyes and mouth. The colouring may intensify within the subsequent two or three days, after which it begins to fade and completely disappears by the seventh to tenth day of life. A more protracted period of jaundice (4-8 weeks) is noted in premature infants, and it is more marked in them. This type of jaundice is a physiological feature that does not usually affect the general condition of the child: the skin retains its normal firmness, the stools are normally coloured. It is only in cases of very acute physiological jaundice that a general flabbiness appears, weight gains are low, and the urine is dark. There are three prominent factors in the onset of physiological jaundice. First of all, the fetal blood contains an increased number of red blood cells, as is the case with people who are ascending a high mountain; the red blood cells are the carriers of oxygen, and the fetus, just as the mountain-climber, experiences an oxygen deficiency. After birth the infant receives a sufficient supply of oxygen from the atmosphere and the excessive number of red blood cells disintegrates; the pigment of these cells is converted into bile pigments, so that the bile pigment level of the circulating blood increases. The liver of the newborn does not function properly yet, so it cannot detain the bile pigments, and part of the latter remain in the blood. The walls of the blood capillaries are spongy in the newborn, therefore the bile pigments pass through them into the skin, the mucous membranes of the mouth, eyes and visceral organs, imbuing them with a yellow tinge. This physiological jaundice of the newborn calls for no special treatment.

The *skeleton*. The bony tissue of the newborn is immature, its content of calcium—on which the strength of the bones depends—is low, and some of the bones are still only cartilages. There are clefts called fissures between the skull bones; the quadrangular occipitus carries one large fontanelle, and two small ones lie laterally in the back of the skull. These fontanelles permit the skull bones to override each other, decreasing the size of the head and thus making its progression through the birth canal easier (molding). As a rule, the misshapen heads sometimes observed in babies subsequently become normal. The head of the newborn is large, its height constitutes $^1/_4$ or $^1/_5$ of the crown-heel length; in adults the height of the head is only $^1/_8$ of the total height of the body (crown-heel length).

The arms and legs are of equal length. As compared with body length a baby's legs are short. The trunk is much longer than the arms and legs, and this is more noticeable in premature infants. The spinal or vertebral column consists principally of cartilage; the prenatal curve of the spine is retained, but it straightens out easily when the child is laid on a flat surface. The chest is barrelshaped, not flat. The ribs consist predominantly of cartilaginous tissue, therefore they are soft and resilient, not bony. The ribs are almost perpendicular to the vertebral column, while in adults they take a slanting position. Owing to this position of the ribs the chest does not expand completely during respiration, nor does it fall completely, thus the position of the ribs and chest resembles that of inhalation in later life. These peculiarities in the structure of the chest should always be borne in mind when handling the newborn.

The *nails* always cover the tips of the digits.

There is always some *hair on the head*, of various length, density, and colour.

The *muscles* are underdeveloped, particularly the muscles of the extremities. The newborn infant retains its intrauterine position, its arms and legs bent; this condition depends on the development of the nervous system. Resistance to the extension of the extremities is observed, a condition of physiological hypertonia that gradually disappears as the child grows.

The *breasts* of infants born at term and infrequently of premature infants as well are more or less enlarged (swollen), acquiring a firmness that is not reflected in the colour of the skin. A liquid discharge, resembling colostrum, may frequently ooze from the nipples. The breast engorgement is a physiological condition that gradually resolves within the first month of life; it is a reaction due to the endocrine activity of the maternal organism during the last month of pregnancy which causes the appearance of colostrum in the mammary glands of the mother after delivery. Moderate engorgement of the infant's breast requires no treatment.

The *temperature of the body* of the newborn, particularly following premature deliveries, oscillates and is unstable owing to the immaturity of the central nervous system, especially of the thermoregulating centre. Consequently, conditions must be created for the newborn infant to exclude both overcooling or overheating of its body (excessive warmth of room, or warming pad, too much clothing, or, on the other hand, too light clothing and a too cool room).

On the third or fourth day of life the body temperature may sometimes go up to 38-40°C, particularly if the infant is a heavy one. This condition is called transitory fever of the newborn, or dehydration fever, and it is concomitant with the greatest physiological weight loss. The condition of the child hardly changes at all. The fever subsides quite soon (in 3-4 hours) after abundant liquid intake (water or weak tea). A check-up should be made on managing the child to eliminate possible overwarming.

Physiological loss of weight is observed in all newborn infants. The weight decreases during the first 3-4 days (less commonly 6 days), and then the baby begins gaining weight, so that by the 7th or sometimes 10th day the birth weight is recovered and a further increase is noted. The initial weight of premature infants is only restored on the 10th to 20th day of life. There are several causes underlying this physiological weight loss. The basic cause is that water metabolism is still faulty in the newborn, and, moreover, his intake of food (breast milk and water or tea) is insufficient in the first days of life. However, it is very difficult to make babies of this age take large portions of milk or water. Overwarmth (high room temperature, too much covering) is conducive to physiological weight loss as it intensifies evaporation of water through the skin and lungs.

Nervous system specificities. The brain of the newborn is large, but its sections, as well as the nerve cells and nerve fibres that make up the brain tissue, are underdeveloped, particularly in premature infants. The chemical constituents of the brain of the newborn also differ from those of the brains of older children. The structure of the spinal cord is more advanced than that of the cerebral hemispheres. This explains the behaviour of newborn babies, the chaotic and vermicular motions they make. The reflexes centred in the spinal cord are stronger than the brain reflexes. The movements of the eyes are not always adjusted, and squinting or oscillation of the eyes from side to side (nystagmus) are normal for the newborn; this condition soon disappears.

Light perception is present at birth, as manifested by the clear reaction of infants to bright light. The newborn infant will blink upon the appearance of a sudden bright light, although the winking reflex is absent when some object is approached to the eyes.

The *globe of the eye* is not fully developed, the iris contains no pigment, therefore newborn babies have bluish-grey eyes.

Hearing is poor in the newborn, but they do react to loud sounds.

The *taste* of the newborn is developed. They react to a sweet taste by intensive sucking, and express distaste when something bitter, salty, or sour is applied to their tongues.

The *sense of smell*, or reaction to odours is poor directly after birth, but already in the first days of life a strong odour emanating from the mother may be the cause of the baby refusing to nurse at her breast (the smell of perspiration, tobacco, paint).

Heat and cold sensations, as well as the sensation of pain, are present in the child at birth; in premature infants these sensations are lowered.

Respiration in the newborn. The nose of the newborn baby is very small, its passages are narrow and lined with a mucous membrane that tends to swell even with the slightest cold; such swelling can obstruct breathing, cause blue rings to form around the mouth and nose, and make the baby refuse to take food. The cartilages of the throat (pharynx) and windpipe (trachea) are very thin. The mucous membrane which lines them also tends to swell, and the bronchi are narrow; in the lungs the elastic fibres that make these organs resilient are poorly developed. We have already spoken of the peculiarities of the bones of the chest (the thorax) and of the immaturity of the respiration centre. More air is passed in 24 hours through the lungs of the newborn than through the lungs of adults, so high is their oxygen demand. Their costal and abdominal muscles take almost no part in the act of respiration, just the opposite of what occurs in adults; respiration of the newborn is chiefly effected by contraction and relaxation of the diaphragm, the musculotendinous partition which separates the thorax and abdomen.

Thus we see why the respiration of newborn babies is shallow, irregular, accelerated (40-60 respirations per minute instead of the 16 adult respirations). Severe respiratory trouble is quite frequently caused by respiratory disorders to which newborn infants are very liable.

The structure of the newborn's *ear* differs from adult structure. The external auditory canal is narrow; the Eustachian tube which connects the ear and the pharynx is short and wide and runs on an almost horizontal plane, facilitating the penetration of food and germs from the pharynx into the middle ear; such penetration is conducive to ear trouble. The structure of the tissues of certain sections of the ear differs greatly from its subsequent adult structure.

Blood circulation. While in the womb the fetus is supplied with the oxygen needed for its existence by the mother through the placentary blood vessels and the umbilical cord that connects the fetus to the placenta. After the cord has been cut oxygen is derived directly from the surrounding air through the infant's lungs. The excess of carbon dioxide formed by the vital activity of the baby's system is eliminated from the blood through the lungs. The heart governs the circulation of the blood through the blood vessels, and the activity of the heart and of the entire cardiovascular system is regulated by the nervous system. The heart muscle is thin and delicate. The pulse of the newborn is accelerated to 120-140 beats per minute as compared with the 68-70 beats of adults. It is very changeable and may be as frequent as 160-200 beats per minute when the baby cries. The circulation time (the lapse of time between the emergence of the blood from the heart to its return) is shorter than in subsequent adult life (12 seconds in the newborn, 18-20 seconds in adults). However, the total volume of blood in the circulatory system is relatively higher in the newborn than in adults as compared with body weight. Consequently, blood circulation in the newborn is very intensive. The circulation load is a heavy one; therefore dysfunction of other organs may rapidly lead to cardiovascular disorders.

The *gastrointestinal tract* of the newborn differs in many aspects from that of older infants. Very little saliva which is necessary for the digestion of more solid food is secreted by the salivary glands. Yellowish soon disappearing spots are seen on the median line of the hard palate. Ridges at the gum margins help the baby hold the nipple better. The transverse striation on the lips in the shape of whitish pads serve for the same purpose. In full-term babies the swallowing and sucking reflexes are already well-established. Evacuation of the bowel is slow in the first days of life, and, what is more, an increased sensitivity of the internal (mucous) membrane of the stomach is noted; the latter is evidently the cause of the tendency of newborn infants to throw up. The muscular and elastic tissues that make the walls of the stomach and intestines resilient are not properly developed, therefore these organs become easily distended by gases that are formed owing to bad management, faulty nutrition, or illness. This condition may make the baby restless and even cause him to refuse his food; moreover, the upward pressure of the distended intestines on the diaphragm disturbs normal respiration. The intestinal walls are easily penetrated by bacteria (germs) and toxins (the poisons produced by the bacteria) that may be the cause of a systemic disease in the baby. The relative length of the intestinal tract is longer in the newborn than in adults.

The *pancreas* produces digestive juice that is delivered into the stomach.

The *liver* produces and discharges bile, a digestive agent, into the intestine; moreover, the liver detains and renders harmless toxins delivered to it from the intestine by the blood, into which they are absorbed through the intestinal walls. In the newborn this function of the liver is defective and therefore it is easier for bacteria and toxins to penetrate into the systemic circulation and cause disease in the baby. These facts again stress the significance of proper care and nutrition in handling the newborn.

The *meconium* is the first fecal discharge of the newborn. It is dark-green and pasty; in 2-3 days it becomes looser, browner, and, gradually changes colour, within several days turning into the yellow acid-smelling stool of infants, sometimes containing white clots of fat. The average number of stools passed by the newborn is 3 or 4 in 24 hours, but in some infants normal bowel movements are not established so quickly; they may be loose, greenish, slimy and occur 5 to 8 times a day. However, the baby's general condition is not affected and no treatment is necessary. This is a so-called transitory catarrh in which the instability of the stool is due to the immaturity of the nervous system which governs intestinal activity.

The *kidneys* are externally well-developed in the newborn, but their internal structure and function are immature. The diurnal (24 hour period) volume of urine is very variable, and increases with every day. Urination may be completely absent on the first day, or the amount voided may range from 6 to 55 ml and increase by the end of the first week to 270-290 ml. The number of micturitions is also not constant, 4-5 times at the beginning of the first week, rapidly increasing to 20-25 micturitions in 24 hours by the end of the first or beginning of the second week. During the first few days the urine is almost colourless, then it becomes yellow. After standing for some time it turns cloudy—this is due to precipitation of salts. A pinkish-orange spot may be seen on the baby's wet diaper sometimes, and also fine sand of the same colour on the genitals. This sand is urate, salts of urea, and its discharge is a normal physiological occurrence.

The *urethra* is shorter in female than in male babies (in the first it is 1 cm long, in the second 5-6 cm); therefore, faulty hygiene in caring for baby girls facilitates the penetration of infection through the outlet of the urethra; this infection may work its way up into the bladder and kidneys and cause a disease of these organs.

The *external genitals* of infants delivered at term are distinctly developed; the testicles of newborn boys have usually already descended to the scrotum (the pouch in which they normally lie), the major lips of the girls' external genital organs close over the minor lips. It is not uncommon for a white, or less commonly blood-tinged, secretion to be discharged from the vagina of newborn girls. This discharge is associated with a peculiar condition of the mucous membrane lining the inner walls of these organs, a condition resembling that of adult women just before and during their menstrual periods. This phenomenon is the result of the influence of the maternal organism on the fetus.

THE NURSING INFANT

The development of the child is defined by anatomic and physiologic features and by environmental conditions. The child is not a miniature adult; his body possesses certain internal and external qualities distinguishing it from adults. This is manifested first of all in the appearance of the newborn—a large-headed, short-legged creature. Indeed, a comparison of the infant and adult bodies shows that the head of the newborn is disproportionately large, occupying one-fourth of the crown-heel length of the body, while in adults it takes up only one-eighth. The centre of the infant body is above the navel, in adults it is much lower. The extremities of the newborn are relatively shorter than in adults. The circumference of the head is 34-36 cm at birth, increasing to 46 cm by one year. The circumference of the chest is 1cm less than the circumference of the head at birth, by one year it expands to 48 cm.

The internal organs (the viscera) of the newborn are relatively larger than in adults, particularly the adrenal and thymus glands; in the newborn the latter weighs 13-14 g, while in adults it is absent. The weight of the liver is one-twentieth of the total body weight, in adults it is only one-fiftieth; the newborn's intestine is six times longer than his body, in adults it is only four times longer. The nervous system is not fully developed, although the brain is relatively heavy. The immaturity of the nervous system conditions the reaction of the newborn to their surroundings and their psychomotor development.

The process of transformation of the infant into an adult consists of a definite number of stages of childhood, each one of which possesses certain distinct features. The earliest is the newborn stage; its duration is 2-3 weeks; the second stage is the nursing stage or infancy, from 2-3 weeks to 1 year. This period of the baby's life is characterised by an intensive growth of the entire body and by the development of the functions of all the organs and systems.

The weight and length of the newborn depend on sex, parental constitution (particularly of the mother), the number of previous pregnancies. It is known that second-born and subsequent babies are usually bigger than first-born infants.

Boys are usually somewhat larger than girls at birth. The smaller the child, the more intensive is its growth after birth; thus, in the first year of life the growth increase is 25 cm. In no other period of life does a human being gain so much in body length as in this period.

The monthly length gains are particularly high in the first quarter of the first year of life (from birth to 3 months)—3 cm per month; from 3 to 6 months these gains are 2-2.5 cm per month, from 6 to 9 months 2 cm, and from 9 to 12 months only 1-1.5 cm.

If we consider that in subsequent years of childhood the average yearly gain in height is 2 cm we see how intensive all the vital processes are in the first stages of human life.

The evaluation of normal physical growth is not based on height alone, but also on weight, as only such combined data can show whether the condition of the child is normal or otherwise.

A baby delivered at term weighs approximately 3,200 g, and his length (height) is 50 cm. Boys generally outweigh girls by 100 to 200 g. The general laws of weight gain are basically the same as for height gain: the younger the child the more intensive the gain. An infant gains 800 g in his first month of life, subsequent gains diminish.

A formula has been worked out for judging whether the baby is gaining weight normally, and for estimating monthly gains. The gain for the first month is taken as 800 g, and for each of the subsequent months of infancy it will be 50 g less. Thus the formula is expressed as $800-(50 \times n)$, wherein n is the number of months of life. A three-month baby should gain 650 g in this third month of life: $800-(50 \times 3)=650$; at nine months he should gain $800-(50 \times 9)=350$, and so on.

The weight of a baby during any month of life is computed by another formula (applied for judging normal development). In this formula the average monthly weight gain multiplied by the number of months of life (n) is added to the birth weight; the average monthly gain is 600 g in the first six months, and 500 g in the following six months. Thus the weight of a five-months baby is estimated as follows: his birth weight 3,200 g$+$ $+(600 \times 5)=6,200$ g; the weight of this baby at ten months should be $3,200+(500 \times 10)=8,200$ g.

Babies generally double their birth weight by five months and treble it by one year. The birth crown-heel length (height) is only doubled at the age of $4^1/_2$-5 years.

We must point out that these are only approximate figures which reflect the most frequently observed values.

Significant deviations both ways are not uncommon among perfectly normal children. Weight divergences are no sign of disorder in the majority of cases. In other words, low weight is by itself no proof of illness, while, on the other hand, excessive weight is not always proof of good health, as overweight children are frequently affected by some disorder.

However, isolated data on weight and height are not enough for judging normal physical development. Such judgement calls for a proportionate combination of other measurements of the child as well as the circumferences of the chest and head, the length of the arms, legs, etc.

The breadth of the shoulders of well-developed children is approximately one-fourth of their height during all the stages of childhood, the circumference of the chest exceeds that of the head by 1-3 cm by the end of the first year. The circumference of the chest of the newborn is longer than his half-length by 7-10 cm, and this difference increases to 10-13 cm by the time the baby is 2-3 months old.

The height and weight of the child depend on postnatal environmental conditions. Bottle-fed infants do not usually develop as well as breast-fed babies; monotonous food with a low vitamin content is also conducive to inhibition of development.

These are not the only indices for characterising normal physical development. Teething time is another important factor. The majority of babies cut their first teeth at 6-8 months; by one year the child should have 8 teeth. The periods of the eruption of the teeth do not always coincide even in normally developing babies, therefore, as we have already said, the general condition of the child must be judged by a combination of all developmental data.

Things a child has learned and can do are important factors in characterising his development. This is called psychomotor development. The normal development of a healthy child is characterised by a certain level of psychomotor abilities and physical development indices.

Babies are born with sucking and swallowing reflexes. During the first week of life hearing improves, mimetic reactions appear, but the movements are chaotic, the eyes are often crossed and nystagmus is observed (oscillatory movements of the eyeballs in the horizontal or vertical planes). The nystagmus disappears by the second month of life, when the baby begins holding up his head while lying prone, lifting his chest, turning his head in the direction of sounds (a voice, a knock, etc.). When smiled at the baby smiles back.

By three months motor activity increases, the baby clearly detects the direction from which a sound comes, lifts and holds up his head when lying on his stomach, turns from back to side, pulls things into his mouth. A four-month baby reaches out for toys and grasps them, rolls over from back to stomach (supine to prone) and is able to lift the upper part of his body from a prone position supporting himself on his hands. By 5 months most babies can already sit when holding to something, and support themselves on their legs when held up.

By 6 months a baby already sits unsupported, rolls from stomach to back, attempts to creep on hands and knees, tries to say "ba", "ma" and similar syllables. By 7 months muscular tonus has developed enough for the baby to be able to sit up alone, pull to his knees holding to the bed rail or net, and crawl.

The first attempts to stand alone and walk holding to a chair appear at the age of 9-10 months; in the following period these abilities improve and by one year the baby walks freely without support. At ten months he begins saying simple words—"mama", "baba", calls various objects and animals by syllables: cow—"moo", dog—"ow", etc.

By one year children usually can say 7-8 words.

So we see that in normally developed children a good physical development is combined with a definite level of psychomotor abilities, i.e., of motor activity and speech.

The state and development of the child can only be judged on the basis of a conjunction of these factors. A guarantee of the child's well-being is properly managed nutrition and schedule, and provision of the best possible environmental conditions.

THE PRE-SCHOOL AND SCHOOL-AGE CHILD

Weight and height are the most important visual indices of physical development both in the first year of life and in subsequent periods of childhood. However, there is a great difference between the rates of weight gain and stature increase occurring in the different stages of a child's life. Thus, infancy, covering the first year of life, is characterised by rapid gains in both weight and length, while in the second year of life the rate of these gains gradually subsides.

Let us consider the specific features of the separate stages of childhood. The period of early childhood (from 1 to 3 years) is characterised by a more gradual growth in height and by lower weight gains. The majority of babies triple their birth weight by the time they are one year old, and gain 20-25 cm in length, while in the following two years (the second and third) of life only 18 cm are added to height, and weight gains are 2.5-3 kg in the second year and 1.5-2 kg in the third year.

During the pre-school stage (4 to 7 years) children again shoot up rapidly, particularly in the sixth year, adding 8-10 cm to their height. During this period weight increases are not so rapid, therefore children of this age are no longer as chubby as before, but look as if they were losing weight. This is the first period of accelerated growth.

The school age (from 7 to 15 years) may be subdivided into two periods as regards increases in weight and height. The first period begins at 7 and ends at 10 years; it is characterised by a slower height increase (only 3-4 cm yearly), while weight gains are somewhat greater. At this time of their life children again round out, become chubbier. In the second period, which begins at 11 years in girls and 12-13 years in boys, stature increase again becomes rapid. This is the beginning of the second period of accelerated growth. At first girls grow faster than boys, but later the boys catch up and then outstrip them. Weight also tends to increase during this period. Boys of 11-12 years usually weigh more than girls of the same age. The greatest weight gains in girls (5-8 kg a year) are noted at the puberty age (13-15 years), when they exceed boys in weight.

The final stage of childhood is adolescence, or puberty development, the stage of sexual maturation (senior school age). This stage is characterised by continuation of the second period of rapid growth. In girls this period continues until approximately 18 years, in youths until 25. As a rule, human growth thenceforth ceases.

During adolescence weight gains become much lower in girls, while in boys the energy of accumulation of bodily mass increases. Boys again become heavier than girls of the same age.

Thus we have seen that children's growth—increases in weight and in height—follows a certain natural pattern associated with age levels.

The following indices may serve as a loose means for checking normal physical development in children.

1. The crown-heel birth length (height) doubles by 5 years and triples by 14-15 years. The height of children older than one year is computed by the following formula: the height (in cm)=75+(5 multiplied by number of years of life), i.e., the average annual height increase (5 cm) is multiplied by the number of years of the child's life and the derivative is added to the average height of a year-old baby (75 cm).

2. By 5-6 months a baby's birth weight doubles, by 12 months it triples. At 5-6 or even 7 years the child doubles the weight he had when he was one year old, by 13-14 years the seven-year weight is doubled. The weight of any child older than one year may be approximated by the following formula: the weight (in kg)= =9.5 kg+(2 multiplied by number of years of life), i.e., to the average weight of a one-year-old baby (9.5 kg) we add the average annual weight gain (2 kg) multiplied by the number of years the child has lived. It has been found that weight gains are not uniform throughout the year. The highest gains are observed at the end of the summer and in the autumn, the lowest in the spring and beginning of the summer.

The yearly increase in height is also not uniform in the different months: children grow most rapidly in the early spring and summer, and the slowest growth falls on the end of the summer and the autumn. Thus the period of intensive growth in height corresponds to inhibition of weight gain, and vice versa.

Weight and height are not the only indices for characterising normal physical development of children—correct proportional development of the body is also important. The rate of growth of the separate parts of the child's body differs in various age periods. This is particularly noticeable on comparison of changes in chest and head circumferences. The circumference of the head of a healthy newborn infant exceeds the circumference of his chest. By the time the baby is one year old the opposite occurs—the chest circumference begins to exceed that of the head, and in the subsequent stages of childhood the difference becomes clearly visible. This difference (in a normally built child) is approximately equal to as many centimetres as the number of years the child has lived. Thus, the circumference of the chest of a 5-year-old should be 5 cm more than his head circumference.

Growth of the trunk, arms and legs follows a definite pattern. The limbs of children grow faster than the trunk, but the growth of the limbs ends earlier than that of the trunk. Therefore, the younger the child, the shorter the relative length of his extremities.

The intensity of weight and growth gains, and also of other physical indices, depends on a number of essential points. The child's individual traits are very important, as are physiological and mental features governed principally by the central nervous system. Of extreme importance are dietaries and proper schedules, coupled with the conditions in which the child grows and develops. Various diseases also affect the physical development of the child.

The general characteristic of a healthy child cannot be restricted to his physical development alone, all the more so since some deviation from average weight, height, and other measurements is very probable and is frequently observed among healthy, normally developing children. Motor and intelligence development are extremely important. The neuropsychic development of the child depends principally on environmental influences. The older the child becomes, the more stimulation he receives and the more perfect become his response reactions. Every age period is characterised by definite possibilities for development and improvement of skill. The matter is greatly facilitated by keeping to a definite schedule, by a proper pedagogical approach and the creation of optimal conditions for the child's life.

The basic indices showing the neuropsychic development of the child in the different stages of childhood may be briefly characterised as follows:

At the age of 1-2 years children improve their motor abilities, start walking confidently, expand their vocabulary; they understand what is said to them, obey their elders. At this time they start taking an interest in other children of their own age. They are very inquisitive, and so extremely active that they are easily tired out. The mental development of the child improves greatly in the third year of life. His curiosity about everything he sees and hears grows still greater, he loves to look at books, recognises pictures of various objects, knows the basic colours, easily memorises simple verses, acquires a number of simple sanitary habits. Elements of compassion, bashfulness and other feelings may appear in the behaviour of children of this age.

Between the ages of three and four children make still greater progress in their development. They already use long sentences in talking. They imitate grown-ups in many things. Their emotional perception becomes still finer, feelings of shame, fear, and even of anger, appear. Their attitude to other children is selective. They love to have books read to them, and try to retell the stories by the pictures in the books, attempt the drawing of various objects, men, animals, etc.

In the pre-school age (from 4 to 7 years) the cerebral cortex reaches its final development. Personality traits are defined more clearly. Children now like to play with other children, display a group feeling. In the family most children have their simple duties, they love helping their parents. Their speech becomes more coherent, many children even begin to read and write. After the age of seven, when children start school, a further development of the intelligence, the formation of human personality occurs. The neuropsychic development of the child, particularly in early childhood, depends to a great extent on the conditions the child lives in, on regimen and proper care. Normal and timely physical and psychomotor development depends largely on carrying out the advice of the doctor who regularly examines the child.

Part Three

NUTRITION, TRAINING AND SCHEDULES OF HEALTHY CHILDREN

FEEDING BABIES IN THEIR FIRST YEAR OF LIFE

Normal development of a child depends on wholesome food, correct schedule, and proper care.

The most intensive growth occurs in the first year of life; by the end of this year the baby's birth weight triples. The best food for the nursing infant is breast milk; this milk contains all the substances needed for rapid growth, thus providing for the child's normal development. Mother's milk is warm, clean, free of germs. It is easily digested by the baby and therefore can have no bad effect on the activity of the alimentary tract. The proteins, fats, and carbohydrates contained in breast milk provide the growing organism with the building material necessary for the construction of new and restoration of disintegrating cells and tissues. With breast milk the infant gets the mineral salts (calcium, phosphorus, iron, copper, cobalt, and others) needed for the growth of his bones and teeth, as well as for normal nervous and muscular activity, and for normal blood formation. The quantitative ratio of the different mineral salts in mother's milk makes this milk more digestible than cow's milk. Breast milk also contains a number of substances (vitamins, immunogenic bodies, enzymes, hormones) that are absent or destroyed in cow's milk through sterilisation. The intestines of breast-fed babies are inhabited by specific microorganisms that produce vitamins of the B group during their reproduction; this group of vitamins facilitates a more efficient utilisation of the food constituents.

Practice has shown that breast-fed babies are more resistant to infections than bottle-fed babies. Breast-fed babies ail less, their sicknesses are milder and more favourable than in bottle-fed babies.

Therefore every healthy mother should nurse her baby on the breast. To avoid infecting the baby through the mouth while breast-feeding the mother must observe scrupulous cleanliness: her nails should be cut short, she should bind up her hair before nursing the baby (and if she has a cold a face-mask should be worn), the hands must be washed very thoroughly, the breast should be washed daily with soap and warm water, and just before nursing the nipple and adjacent area should be swabbed with a piece of absorbent cotton dipped in boiled water or 2 per cent sodium bicarbonate. It is not advisable to wash the breast with soap before each nursing, as soap loosens the superficial layers of the skin and is thus conducive to the development of cracks, making breast-feeding difficult. The child should be nursed in a peaceful atmosphere, and neither the mother nor her child should be distracted at this time.

In the period immediately following childbirth some mothers have pains in the lower part of the abdomen. This pain is due to the fact that when the infant suckles at the breast the stimulation derived by the nipples is transmitted along the nerves to the uterus; the latter contracts, causing some degree of pain. Nursing is beneficial for the mother, as it is conducive to contraction of the uterus and its more rapid return to normal dimensions.

During the first 2-3 days after delivery the mother's breast secretes colostrum, a thick, yellowish, high-calory liquid abundant in proteins, salts and fat.

The volume of colostrum in the breast is small, and the infant withdraws very little. This is quite normal and should cause no anxiety. It is important that the baby be put to the breast at every scheduled feeding, as sucking stimulates the mammary glands and is conducive to milk secretion. The milk comes in on the third or fourth day; the breasts are at first engorged, but this condition disappears in a day or two and normal lactation sets in. The milk requirements of the baby grow from day to day. Complete evacuation of the breast has a benign effect on lactation; this is best effected by a normally sucking baby, as his efforts are more effective than expression of the milk manually or with a breast pump. Any milk remaining in the breast after the baby has been nursed should be expressed, even if it is no more than one or two teaspoonfuls. Milk that has not been withdrawn from the breast blocks the milk ducts and thus inhibits milk production. This may soon lead to loss of the milk supply altogether.

In cases when the mother has to miss one breast-feeding (engaged at work, a weak baby, etc.) the milk must be expressed with clean hands into a boiled bottle that is then tightly stopped with a cotton plug and put in a cold place. Before giving the baby this milk it has to be warmed to body temperature.

The baby should be given only one breast at each nursing. The other breast rests at this time, accumulating milk. If the milk supply is insufficient the second breast may also be given, but then this breast should be offered first at the next feeding (to complete evacuation).

It is not advisable to keep the child at the breast for longer than 20-25 minutes, as he withdraws the greater part of his meal within the first 5-10 minutes, and the rest of what he requires in the following 5-10 minutes. After 20-25 minutes the baby gets tired, falls asleep, while the tender skin of the nipples suffers, abrasions and cracks form easily.

Some mothers are under the misapprehension that beer stimulates milk production. This is not so. Beer taken in large quantities is harmful, as the baby's brain is very sensitive to alcohol.

The volume of milk produced by the mother depends on proper diet, emotional balance, and a good schedule which should allot sufficient time for sleep (no less than 7-8 hours in 24 hours). A nursing mother needs a variegated diet, as food is the source of the milk constituents. Her dietary should contain meat, fish, and vegetables, milk curds (cottage or cream cheese), flour and cereals. Raw vegetables, fruits and berries are the foods that mostly contribute to the vitamin content of the mother's milk.

The volume of fluid ingested by the nursing mother should be one litre above what she usually takes. Sweet tea with milk is a very good beverage, so is a concoction of roasted grains with milk, also kefir (milk fermented with kefir yeast), clabbered milk (sour milk or yoghourt), acidophilus milk.

Mothers are also mistaken if they believe that the last portion of milk in the breast is the most nourishing as it is thicker and yellower. The baby should get the complete content of one breast, as the first milk has a higher protein and mineral salt level (the building materials needed for the baby's rapidly growing body) and the last milk a higher fat content. Directly before putting the baby to the breast only a few drops of milk should be expressed to get rid of any germs that may have penetrated into the outlets of the milk ducts.

Correct position during nursing is an important point. The mother should sit down comfortably in a chair and not bend over the child. The baby is held on one arm and the lower part of his body is supported by the mother's leg placed on a footstool. The mother must see that the baby's nose is not closed and hold the breast away from his nostrils with the index and middle fingers of her free hand. Nursing while lying down is permitted only on the days immediately following delivery.

It has been found that it is best to put the infant to the breast for the first time 12 hours after delivery.

It is very important to get the infant used to fixed hours for nursing from the very first days of his life, as this establishes a definite rhythm of gastrointestinal secretion. Intestinal activity is disturbed by not keeping to a definite schedule. After the first nursing the baby should be put to the breast every 3 hours (7 times in the 24-hour cycle) with a 6-hour break in the night. Strong, healthy suckers may be fed every $3^{1}/_{2}$ hours with a $6^{1}/_{2}$ hour break in the night (6 times in 24 hours). However, if the child becomes restless before his scheduled time he may be given the breast 10-15 minutes earlier, or, should he be asleep, the nursing session may be moved up 10-15 minutes. The baby should not be nursed at night, this is bad for him. The infant's body, his alimentary system must rest during the night. Night restlessness may be relieved by warm water or tea with 5 per cent sugar (one teaspoonful of sugar to half a glass of water).

The following number of feedings per 24 hours are recommended:
in the first 2-3 months of life 7 feedings every 3 hours with a 6-hour night break;
from 2-3 to 5 months 6 feedings over $3^1/_2$ hour intervals with a $6^1/_2$ hour night break;
from 5 months to one year 5 feedings with 4-hour intervals and an 8-hour night break.
Thus the hours for nursing the baby work out to:

for babies fed 7 times a day 6 a.m., 9 a.m., noon, 3 p.m., 6 p.m. 9 p.m., and midnight.
for babies fed 6 times a day 6 a.m., 9.30 a.m., 1 p.m., 4.30 p.m., 8 p. m., 11.30 p. m.
for babies fed 5 times a day 6 a.m., 10 a.m., 2 p.m., 6 p.m., 10 p. m.

How is one to know whether the infant is getting enough milk? Peaceful sleep, contentedness, active wakefulness, and good weight gains are proof of a sufficient intake of milk. Should the mother be in doubt the doctor's advice must be sought immediately. The doctor will establish the amount of milk ingested in a day by repeatedly weighing the baby on scales (before and after nursing) and will tell the mother what to do. If it becomes apparent that the intake of milk does not cover the child's requirements he should be given a complementary amount of milk obtained from another woman. If no donor milk is available the baby is put on a mixed diet of breast milk and cow's milk formula.

The mother must always remember that even a small amount of breast milk is a valuable food for the child, and should therefore not cease nursing. The number of feedings does not change when the baby is put on a mixed diet.

The complementary milk should be given after the baby has nursed at the breast, and not before, since less energy is needed for sucking from a bottle than from the breast, and therefore, finding the bottle so easy, the baby refuses the breast altogether. The hole in the rubber nipple that is put on the bottle should be as small as possible.

Formula should be given at first in very small quantities so that the infant can gradually become used to the new food—cow's milk. However, since cow's milk differs from human milk (it contains more proteins, mineral salts and less sugar than the latter) it is specially prepared (hence the word formula). Cow's milk is diluted with cereal water (rice, buckwheat, oatmeal) and 5 per cent sugar is added.

The No. 3 formula is most frequently used for the $1^1/_2$ to $4^1/_2$ month baby (2 parts of milk plus one part of cereal water plus 5 per cent sugar). The cereal water is prepared by cooking 5 teaspoonfuls of sifted and washed dry cereal in half a litre of water for 1-$1^1/_2$ hours, after which it is strained through a sieve. To this liquid enough boiling water to make up half a litre is added. The cereal water must be prepared afresh every day.

Raw cow's milk is poured into nursing bottles mixed with the necessary quantity of cereal water (as specified above), and 5 per cent sugar is added. To kill the germs that are present in the milk and may have penetrated into it when the milk was poured out the bottles are plugged with absorbent cotton and placed in a pan of warm water that is rapidly brought to the boiling point. The bottles are kept in the pan for 5-7 minutes, then cooled in running water and refrigerated (or kept cold by some other means). Before giving the formula to the baby it is warmed up to body temperature by placing it in warm water. From the age of 3-4 months 10-15 per cent of cream is added to the No. 3 formula.

Instead of formula No. 3 other formulas are also used—diluted kefir, and cream-and-milk mixtures which are prepared by special dairy kitchens catering to babies. Milk formulas are dispensed by these dairy kitchens on prescriptions issued by the local children's doctor.

Another complementary food is formula No. 2 (equal amounts of cow's milk and cereal water plus 5 per cent sugar); this is a "hungry" formula that may be recommended for a short time for the very youngest babies (in the first 1-$1^1/_2$ months of life).

The preparation of cereal water at home calls for much time; if there is no children's dairy kitchen in the vicinity powdered milk produced commercially is a good substitute. The production of the powdered milk is mechanised and it absolutely excludes bacterial contamination. The powdered milk is prepared from certified cow's milk by pulverisation and instant evaporation at a relatively low temperature (no higher than 40-41 °C).

Powdered whole milk, powdered de-fatted milk, powdered cream, and powdered milk specially prepared for nursing infants are available. The powders are diluted in proportions of 1 part of powder to 7 parts of water. The required portion of powder is mixed thoroughly with a small amount of warm water, to obtain a creamy mixture. Then water is added to make up the requisite amount of formula, and the mixture is brought to a boil under constant stirring.

Besides the listed powdered products powdered formulas are also produced: B-rice, B-oatmeal (formula No. 2), C-rice and C-oatmeal (formula No. 3), and powdered acidophilus milk. The latter product is prepared from fresh whole cow's milk fermented with lactic-acid bacteria and acidophilus bacilli. A little boiled water is added to a tablespoonful of this powdered milk and after thorough mixing boiled water at body temperature is added until the consistency of thick cream is attained (no boiling!). Whole milk, undiluted kefir with or without sugar, and powdered acidophilus milk may be recommended as additional foods for babies older than five months.

Never go by the advice of relatives or friends when introducing a new food, as they are not specialists, even though they mean well. Ask your doctor, he will decide what additional food is best for your baby.

Bottle-feeding is permissible only in the complete absence of milk in the mother's breast when donor's milk is unavailable.

Transferring the baby to artificial feeding is an important step, as the digestion and assimilation of any breast milk substitute calls for greater energy expenditures and more intensive digestive processes.

It must never be forgotten that no artificial method of nutrition can be compared with breast-feeding in the early months of life. Bottle-fed babies are less resistant to infections, although they are often quite well-rounded. They are more frequently ill, and, as a rule, their illnesses are more protracted and severe than is the case with breast-fed babies. Therefore refusal to breast-feed must be motivated by very serious objective reasons.

Bottle-fed babies are given the same formulas (table 1, p. 77-78) recommended for complemental feeding in mixed nutrition: formulas No. 2 and 3, kefir No. 2 and 3, whole kefir, whole milk, powdered formulas (see chapter on mixed feeding). However, it is only for the doctor to decide what formula is best for your baby. Food on which one baby thrives may make another baby sick. Upon certain indications therapeutic formulas are prescribed, in which one of the constituents (proteins, fats, carbohydrates) may be either increased or decreased.

Bottle-feeding may often cause quantitative or qualitative under- or overnourishment. Therefore bottle-fed babies are in need of constant medical supervision.

The amount of food required by a healthy baby may be determined by the volumetric method based on the baby's weight and age. The daily amount of food thus computed is:

at the age of	2 weeks	to	6 weeks	$^1/_5$ to $^1/_6$	of body weight
" " " "	6 "	"	4 months	$^1/_6$	" " "
" " " "	4 months	"	6 "	$^1/_7$	" " "
" " " "	6 "	"	9 "	$^1/_8$	" " "

For instance, a 2-month-old baby weighing 4 kg 700 g should be getting 4,700 :6 = 780 g of formula daily. The volume of food in the later half of the first year must not exceed 1 litre.

The food of bottle-fed babies must have a higher protein content than breast-milk, owing to the difference between the protein of cow's and human milk.

There is a widely-spread belief that goat's milk is better for babies than cow's milk. This belief is unfounded, as the qualitative and quantitative composition of goat's milk is still further from human milk than cow's milk. The feeding habits of goats are more conducive to vitamin deficiencies in the milk, and therefore goat's milk cannot be recommended for babies for any prolonged time.

Bottle-fed babies should be put on schedules with longer intervals between feedings as soon as possible (5 feedings a day), as the food of these babies is retained in the stomach for a longer time than breast milk. Cleanliness in feeding the baby is an important factor. The hands must be washed, the rubber nursing nipples should be boiled and have small holes in them. Before giving the bottle to the baby the formula must be warmed. The bottle should be held, not propped, in a slanting position, so that its neck is full all the time. If this is not done the baby will be swallowing air, and this leads to abundant spitting up (regurgitation).

In cases of a general deterioration of the baby's health, intestinal disorders, restlessness and vomiting the doctor must be consulted promptly.

Although milk and milk formulas are irreplaceable food for the infant they soon cease to satisfy all the requirements of the growing body. Vitamin and mineral salt deficiencies soon appear, particularly in babies reared on formulas made with fresh or powdered milk. It is therefore necessary to add, from the second month of life, vitamins in the form of freshly prepared fruit juices (from apples, black currants, lemons, strawberries, tangerines, raspberries) with sugar added. Vegetable juices are also recommended (carrots, tomatoes, beet roots). The best time to give the juices is between feedings, beginning with half a teaspoonful and gradually increasing the portion to 50-60 g daily (3-4 tablespoonfuls).

Vitamins A and D are given with fish-liver oil, commencing at the age of $2^{1}/_{2}$ months, in doses prescribed by the doctor.

After $5\text{-}5^{1}/_{2}$ months breast milk or formula alone is not enough for the baby, and he should be started on supplementary solids.

The most common solid foods and times of adding them in cases of artificial feeding are (after A. Tur):

5 per cent cereal	5 months
10 per cent cereal	$5^{1}/_{2}$ - 6 months
kissel (potato-starch fruit juice pudding)	$5 - 5^{1}/_{2}$ months
sieved vegetables	6 months

toast, crackers	6 - 7 months
yolk of egg	6 months
meat broth	7 months
forced meat	$8^{1}/_{2}$ - 9 months.

Breast-fed babies are started on solids 2-4 weeks later. The solids should be introduced very cautiously, beginning with 3-4 teaspoonfuls and then gradually increasing the amount.

Thus, the first solid commonly added is 5 per cent wheat cereal (farina). This cereal is prepared by slowly pouring 2 teaspoonfuls of dry cereal into half a glass of boiling salted water, stirring constantly. The cereal is boiled for about 15 minutes, after which 1 teaspoonful of sugar and half a glass of hot milk are added. The cereal is stirred thoroughly and brought to a boil. Half a teaspoonful of fresh butter is added.

For making 10 per cent cereal 4 teaspoonfuls of cereal are taken for a glass of liquid.

The food industry produces preliminarily prepared foods for infants such as 5 and 10 per cent farina or a flour mixture consisting of 50 per cent rice flour, 25 per cent oatmeal flour, and 25 per cent buckwheat flour. This mixture, as well as buckwheat flour cereal with milk, is particularly nourishing. The preparation of cereals from flour or flour mixtures requires much less time, as the boiling takes only 3 or 4 minutes.

Cereals should be given with a spoon and not in a bottle from the very beginning, as the baby should learn to eat properly. Otherwise he gets used to liquid food from a bottle and later on refuses more solid food, not being able to eat from a spoon. Sometimes (for instance, in cases of rickets) cereals should be prepared on vegetable broth instead of milk; the recipe is as follows: clean a carrot (50 g), a small turnip (20 g) and a potato (50 g), cut into small pieces, place in three cups of water and cook for 2-$2^{1}/_{2}$ hours, so that 250 g of liquid remains. The broth extracts the most valuable mineral salts from the vegetables, therefore the liquid is strained through a sieve and the vegetables are not used. This broth is used for making cereal.

After the baby has become accustomed to cereal he is given *kissel* (a fruit-juice pudding made with potato-starch) instead of the milk or formula that is given as a complement to the cereal feeding. In the temperate zones of the U.S.S.R. the juice most frequently used is cranberry juice; the preparation of kissel is very simple: 2 tablespoonfuls of cranberries are picked clean and washed, then they are placed in a sieve and scalded. The juice is then expressed from the berries and set aside. The crushed berries are placed in a small pan and a cup of boiling water is poured over them; the berries are brought to a boil and sieved. Part of the water is set aside to dilute the potato starch in. The rest is sweetened with 2 tablespoonfuls of sugar, brought to a boil and the starch mixture is added. The raw cranberry juice is added and the kissel is rapidly cooled.

Vegetables are introduced at 6 months, as they are abundant in mineral salts and vitamins. Vegetables also contain cellulose or roughage which stimulates normal evacuation of the bowels. To prepare potato pureé 3 medium-sized potatoes are washed carefully and then placed in a small pot of boiling water; the pot is covered tightly and the potatoes are cooked until ready. The potatoes are then skinned and rubbed through a sieve; half a cup of hot milk, a pinch of salt, and half a teaspoonful of fresh butter are added and the mixture is beaten. Potatoes may be cooked after they have been pared, only the water they cook in should be used as it contains valuable mineral substances. Egg yolk is given once or twice a week after 6 months, beginning with a quarter or a third of a yolk added to cereal or vegetable purée.

Preparation of *meat broth*: 100 g of soup bones are chopped up and placed in two cupfuls of water and cooked for 2-3 hours over a low fire. The froth is removed. A piece of carrot (10 g), turnip (5 g), onion (3 g) and parsnip are minced and sautéed in a frying pan with fresh butter and then added to the broth.

From the ninth month of life the baby should be having ground, grated, or scraped *meat* twice a week (lean beef, chicken). Liver and spleen pastes are good meat dishes, too. When the child has already cut 5-6 teeth he is ready for meat-balls: ground meat is prepared as for quenelles (with bread or bread-crumbs, salt, onion, egg), then small balls the size of walnuts are formed with wet hands, and the balls are cooked in broth until they float. At 11-12 months, when the baby has learnt to chew, he may be given fried quenelles (ground-meat patties) which children usually like very much.

A normally developed healthy baby should be weaned from the breast by the time he is one year old; this is generally not difficult if the proper solids have been added on time. However, summer is a bad time for weaning, as adaptation to new food may cause intestinal upsets in the baby; therefore he should be weaned either before the warm season sets in or after it ends. New pregnancies or severe systemic disorders of the mother are indications for earlier weaning.

Babies with nutritional and digestive disorders should be breast-fed until they are 14-16 months old.

The weaning procedure is quite simple: babies are nursed at the breast only twice a day at this time; they are given whole milk or kefir with 5 per cent sugar instead of one of these breast-feedings, and a week or week and a half later the last breast-feeding is replaced by cow's milk. To stop the production of milk during the weaning period the mother should restrict her liquid intake and bind her breasts. The milk supply usually disappears within 3-4 days after breast-feeding has ceased.

In feeding babies from 6 to 12 months of age the following must be remembered:]

1. Never put all the food on the table at once. The child may prefer the sweet dish and refuse the first or second dish. Sweet foods alone are harmful, as the child does not get all the body-building substances he needs.

2. Do not give the baby:

(a) egg white, as it is digested with difficulty and frequently causes allergic skin eruptions;

(b) smoked foods, sausages or similar dishes (frankfurters) that may cause stomach trouble. Moreover, the baby may get used to spiced foods and constantly demand them, refusing the ordinary food that his body requires;

(c) rich cakes, pastries, and ice cream; the delicate stomach of the baby may react to unusual food with diarrhea and vomiting;

(d) store sweet cheeses and sweet cottage cheese;

(e) fermented beverages.

Table 1

Artificial Food for Bottle-fed Babies in Their First Year

Age of baby in months	Food	Number of feedings per day	Quantity of food per feeding (in g)	Total daily amount
1	Speransky mixture (formula No. 2)	7	up to 100	
2	Formula No. 3	7	115-120	800-840 g + + 2 tsp. juice
3	Formula No. 3	6	150	900 g + 4 or 5 tsp. juice and 1 tsp. fish-liver oil
4	Formula No. 3 + cream	6	150	900 g + 5 or 6 tsp. juice and 1 tsp. fish-liver oil
5	Whole milk + 5 per cent sugar	4	190	900-950 g
	5 per cent wheat farina + kissel	1		
6	Whole milk + 5 per cent sugar	3		
	10 per cent wheat farina + kissel + $^1/_2$ egg yolk	1	200	1,000 g + 50 g juice and 2 tsp. fish-liver oil
	Vegetable purée + whole milk + 5 per cent sugar	1		
7	Whole milk + 5 per cent sugar, toast, cracker or cookie	3		
	10 per cent cereal + scraped apple + egg yolk	1	200	1,000 g + 50 g juice and 2 tsp. fish-liver oil
	Meat broth + vegetable purée + kissel	1		

Age of baby in months	Food	Number of feedings per day	Quantity of food per feeding (in g)	Total daily amount
8	Whole milk + 5 per cent sugar + cracker or cookie	2	200	1,000 g + 50 g juice and 2 tsp. fish-liver oil
	10 per cent cereal + 1 egg yolk + scraped apple	1		
	Vegetable purée + broth + cottage cheese (pressed curds) + kissel	1		
	10 per cent cereal + whole milk + 5 per cent sugar	1		
9-10	Whole milk + 5 per cent sugar + cracker	2	200	1,000 g + 50 g juice and 2 tsp. fish-liver oil
	10 per cent cereal + 1 egg yolk + scraped apple	1		
	Meat broth + vegetable purée + ground meat + kissel	1		
	10 per cent cereal + whole milk + 5 per cent sugar	1		
11	Whole milk + 5 per cent sugar + cracker	2	200	1,000 g + 50 g juice and 2-3 tsp. fish-liver oil
	10 per cent cereal + 1 yolk + scraped apple	1		
	Soup with meat balls + vegetable purée + kissel	1		
	10 per cent cereal + cottage cheese + berries	1		
12	Whole milk + 5 per cent sugar + cracker	2	200	1,000 g + 50-60 g juice and 3 tsp. fish-liver oil
	10 per cent cereal + 1 yolk + fruit	1		
	Vegetable soup + quenelles + vegetable purée + kissel	1		
	10 per cent cereal + cottage cheese + berries	1		

Note: The second cereal dish is made with vegetable broth (instead of milk), or is replaced by potato purée. For breast-fed babies mother's milk takes the place of formulas and cow's milk.

We have tried to make a brief exposition of the nutrition of babies in their first year of life, and, although the problem is far wider than this concise exposition, still it shows the importance of proper nutrition for the normal development of the child.

FEEDING THE PREMATURE INFANT IN HIS FIRST YEAR OF LIFE

Well-managed nutrition is one of the most important conditions for keeping the premature infant alive and for his normal development. The difficulty of this task is enhanced by the fact that the food requirements of premature infants are higher than those of normally delivered babies, as they have more weight and length to catch up with, while their food tolerance (particularly for fats) is lowered owing to the underdeveloped condition of their gastrointestinal tract due to prematurity. The intensive growth and weight gains point to the necessity of a greater volume of plastic materials (proteins and salts) than is needed by normal babies. Thus an early introduction of protein preparations and complementary food is necessary. The body surface of the premature infant is relatively larger than that of the mature baby, while the absence or poor development of the subcutaneous fat leads to greater heat losses. These losses call for additional energy-producing substances (carbohydrates, fats). The vitamin content in breast milk is not enough for the rapidly-growing body of the premature infant. These babies are therefore in need of additional vitamins.

Practice has shown that premature infants develop properly only when they are nursed on raw breast milk. Hence it is very important to provide premature infants with a supply of breast milk.

Premature infants delivered long before term are very weak, and frequently they cannot suck or even swallow milk. Special knowledge and skill are needed for feeding such infants.

Consequently, the task of feeding a premature baby is indeed a difficult one.

In the absence of the sucking and swallowing reflex (commonly in infants weighing less than 1,300-1,200 g at birth) the food has to be introduced into the stomach through a tube. In the presence of the swallowing reflex, while the sucking reflex is still absent (infants weighing 1,300-1,400-1,500 g), the baby is fed from a small spoon. Healthy premature infants weighing over 1,500 g are usually fed from a bottle, and put to the breast once or twice a day; infants weighing more than 1,800 g are breast-fed. It should be borne in mind that owing to general muscular weakness the premature infant often ingests very little or nothing at the breast, as his sucking efforts are too weak to withdraw the milk. Such babies must be fed (after the breast) from a spoon or bottle.

The premature newborn is given his first feeding earlier than the normal newborn, i.e., within 6 to 8 hours following delivery. If a birth injury has been sustained or is suspected the first feeding is given a few hours later.

The stomach capacity of the premature infant is small, therefore only 3-5 ml of breast milk are given in the first feeding (depending on the infant's birth weight).

The following computation is a practical guide for determining how much breast milk is needed in the first month of life.

The newborn requires 50 g of breast milk per kg of weight per day at birth, 100 g by 2 weeks, and 170-200 g by the time he is one month old.

After one month the daily volume of food intake should be $^1/_5$ of the body weight, but should not exceed 1 litre in the first year of life.

It is recommended to nurse premature infants weighing less than 1,300 g every 2 hours—11-12 times in 24 hours. These infants are frequently unable to swallow and must therefore be fed through a tube. To avoid injuring the tender mucous membranes by frequent introduction of the tube, tube feedings may be given less frequently (6 times over 4-hour intervals), but in double portions. The appearance of sucking motions when the tube is introduced signifies that it is time to start feeding the baby from a bottle. Infants weighing 1,400 to 1,600 g are fed every two hours, with a 4-hour interval at night, 11 feedings in all.

Premature infants with birth weights of 1,700-2,000 are usually fed 9 times in 24 hours, over $2^1/_2$-hour intervals with a 4-hour break at night. Infants weighing more than 2,000 g are fed 7 times, every 3 hours (with a 6-hour night break).

The best food for the premature infant is breast milk. However, it meets the infant's requirements only during the first three weeks of life. When breast milk is the only food for a more prolonged time weight gains become either low or absent. When the premature infant is 3 weeks old his food must be complemented by protein in the form of protein preparations (plasmon, etc.), curds (cottage cheese) or special formulas (protein milk, buttermilk). Plasmon is first diluted in a 10-fold volume of breast milk, then the mixture is brought to a boil, cooled and refrigerated (or kept in a cold place). The addition of the protein preparations to the feeding starts with 0.5 g (this is the quantity contained in 1 teaspoonful of milk mixed with plasmon or other protein preparations), and is gradually brought up to 3-4 g per day. Buttermilk (clabbered milk deprived of fat with 2 per cent flour and 5 per cent sugar added to it) and protein milk are available, by prescription, at the dairy kitchens for babies. They are first added to one or two feedings, beginning with one teaspoonful, later to 3-4 feedings, and finally they are added to each feeding, their volume reaching 10 per cent of the daily food intake.

From the age of $1^1/_2$-2 months the buttermilk or protein milk may be replaced by kefir No. 3 (or formula No. 3) with 5-10 per cent sugar.

The addition of solids to the nutrition of premature infants follows the same sequence as for normally delivered babies, but each type of food should be given a month earlier as compared with babies delivered at term (see section on feeding babies in the first year of life). The first solid, farina cereal, should be given to the premature infant when he is 4 months old.

Fats are not recommended during the first two months of life as they are digested with difficulty and may cause a rapid impairment of the digestive processes.

Upon the birth of twins each baby may be "assigned" to a definite breast if the mother produces enough milk. If maternal lactation is insufficient unboiled breast milk obtained from another woman should be used. An important point here is that the woman who gives her excessive milk to another child must be healthy (as

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proved by a preliminary medical examination). The milk is expressed manually with clean hands into a clean, boiled nursing bottle. This milk should be refrigerated (or kept cold by some other means) for no longer than 2-3 hours before being given to the baby. If it has to be kept longer it must be freed of harmful bacteria by warming (the bottle is placed in a pan of warm water at 60-70°C for 20-30 minutes). The value of such pasteurised breast milk deteriorates, as the process partially destroys the vitamins, hormones, immunisation bodies and enzymes contained in the milk.

Transition to a mixed or artificial diet has a bad effect on the development of babies in the first months of life and is very difficult to manage.

The premature infant is in need of a complementary of vitamins (C, B_1, B_2) from the very first days of his life for the improvement of metabolic and oxidation processes.

The premature infant is threatened with rickets and anemia beginning with the end of the first and commencement of the second month of life. These disorders may be prevented, or at least mitigated, by proper care and feeding, observance of schedules, prophylactic measures against other diseases. Vitamin D is indicated for premature infants when they are 3 weeks old, to avoid rickets.

To sum up what has been said in this chapter we must again stress the importance of breast-feeding for the premature infant. Early transition to mixed or artificial feeding is frequently too difficult a task for the weak, functionally underdeveloped organism of the premature baby.

It goes without saying that all the hygienic rules recommended for normally delivered babies must be observed in managing premature babies, who are particularly sensitive to defections of this kind. A tense or depressed condition of the mother owing to the premature delivery has a negative effect on her milk output. Therefore proper regimen and nutrition, peaceful surroundings, regular nursing at the breast, and thorough manual expression of any milk left in the breast after the baby has nursed are important factors in increasing lactation.

The wide scope of individual traits among premature infants and their liability to frequent illnesses make it important for their nutrition to be under constant medical guidance.

FEEDING CHILDREN AFTER ONE YEAR OF AGE

Everything said concerning the role of nutrition and of the elements of diet in the first year of a baby's life is just as important in the subsequent periods of childhood. However, the vast difference between the dietaries of infants and adults is already outlined: the child is given a greater variety of dishes, his food does not call for such scrupulous preparation, his meals become less frequent—in a word, his food and feeding habits become quite grown-up. Even so, dietary requirements are high throughout childhood. The food ingested by adults maintains metabolism and work capacity, while in children it is also the body-building material that must satisfy the greater demands of the growing body. Herein lies the specificity of nutrition in childhood. Principles of proper nutrition should be instituted during the first year of a baby's life. Parents must not allow themselves to be "led" by their baby even at this early stage; they should accustom him to new foods and dishes by variegating his meals, should teach him to chew his food carefully and eat without inducement, toys, stories, threats or punishment.

Observance of feeding schedules is essential. A child who is used to having his meals at definite hours and is given no snacks between meals will always have a better appetite than another child of the same age who has no definite schedule. Schedules are based on what has already been said of the rhythmic activity of the stomach and intestine, and of the secretion of enzymes just before meals are due.

We have already learned from the article on nutrition of babies in their first year of life that by the end of the year the child should be fed 5 times a day. It is recommended to continue this number of feedings until the child is 18 months old, if he himself does not indicate his readiness for four meals a day. Naturally, the baby will not tell you this in so many words, but attentive parents will note that the child is not hungry at any meal except the first, fusses at table, is restless, and generally seems to be full. However, such unwillingness to eat is not attended by any disturbances in behaviour or development.

In the 5-meal schedule equal intervals between meals are retained (4 hours), but the nature of the meals changes, becoming breakfast, mid-day dinner, afternoon lunch, and supper.

The daily caloric intake is now no longer divided equally between the different meals: first breakfast 20 per cent, second breakfast (or light lunch) 10-15 per cent, mid-day dinner 30-40 per cent, afternoon lunch 10-15 per cent, and supper about 20 per cent of the total daily calories.

On conversion to food this distribution is roughly as follows:

First breakfast: milk, toast, cracker, cookie, or bread and butter.

Second breakfast (light lunch): cereal cooked with milk, or with meat or vegetable broth. Raw apple, berries, apple sauce.

Mid-day dinner: meat soup with cereal and vegetables, puréed soup, creamed soup. Vegetable purée, potato patties, rice patties, vegetables mashed with meat. Kissel.

Afternoon lunch: beaten apple pudding, junket, farina with apples, clabbered milk (sourmilk).

Supper: milk (with or without roasted grain beverage), toast, cracker, white roll (bread). Apple, berries, other fruits.

This ration was proposed by Professor A. Tur. The volume of food taken at each meal is 200-250 ml.

If children younger than 18 months are ready for four meals their schedules should be changed accordingly; for older children a 4-meal schedule is obligatory. In this schedule, the intervals between meals vary. Two types of schedules are recommended, depending on family convenience.

1st type	*2nd type*
Breakfast: 7.30-8.00 a. m.	*Breakfast*: 7.30-8.00 a. m.
Dinner: 12.00 a. m.-1.00 p. m.	*Lunch*: 11.00-12.00 a. m.
Lunch: 4.00-4.30 p. m.	*Dinner*: 4.00-4.30 p. m.
Supper: 7.00-8.00 p.m.	*Supper*: 7.00-8.00 p. m.

The first type of schedule has the advantage of giving the child half of the daily calories during the first part of the day; however, this schedule is suitable only for pre-school youngsters and schoolchildren in the lower grades who are in the morning shift, therefore the second schedule is more appropriate for other schoolchildren. Its observance calls for well-managed lunch facilities at school.

Approximate menus for both types of schedule are cereal, roasted grain milk beverage, white roll (bread) and butter, and an apple for breakfast; clear broth with meat-balls, fried quenelles (meat patties) with fried potatoes or carrot purée, and stewed dried fruit, fresh fruit or berries for dinner; fermented or acidified milk

Table 2

Mean Daily Amount of Food Recommended for the Pre-school and School Age Groups (in g)

FOOD	AGE				
	1-3 yrs	3-5 yrs	5-7 yrs	7-11 yrs	11-14 yrs
Meat (flesh alone)	40-60	60-80	80-90	100	125-150
Fish (instead of meat)	50-70	70-80	80-90	170	200-220
Eggs (number)	$^1/_2$-1	1	1	1	1
Milk	600-700	500-700	500-700	400-500	400-500
Cottage cheese (pressed curds)	25-50	40-60	50-100	30-45	40-45
Thick (sour) cream	10-20	20-30	30-40	20	25-30
Cheese	5-15	15-20	20-25	10	10
Fresh butter	20-25	30-35	40-45	45-50	60
Vegetable oil	0-5	0-10	0-15	10	15
Cereals (dry)	30-35	40-45	45-50	50-75	70-85
Bread (white, brown)	100-130	150-200	200-250	250-275	325-375
Sugar	70-90	70-90	70-90	70-90	70-90
Vegetables (various)	150-200	200-250	250-300	250-300	300-400
Potatoes	100-150	150-200	200-250	250-300	350

(sourmilk, kefir) and a roll with butter, jam, or honey for afternoon lunch; boiled potatoes with thick cream, tea with milk and bread for supper. The menu for the second schedule is buttered macaroni, radish or green onions with thick cream, roasted grain milk beverage, white bread and butter, and an apple for breakfast; a sandwich with butter and a meat patty (quenelle), and tea or milk for lunch; pea soup, boiled meat and mashed potatoes, fruit or berries for dinner; vegetable stew, sweet pie and kissel for supper.

Naturally, the above menus are only illustrative, showing how the calories are distributed in practice.

Special studies have been made of the daily food requirements of children. On the basis of these studies daily rations for the different age groups have been computed (Table 2). Of course, nobody would ever try to make up a daily menu of all the recommended products, therefore the weekly quantities are computed, so that the entire ration is used over the week.

Parents often ask about the quantity of food required by children of various ages. Of course, the amount of food ingested by the child depends on his appetite, habits, and bodily requirement; however, rough averages for the different age levels are as follows:

	1-3 yrs	3-5 yrs	5-7 yrs
Cereal (cooked)	150-200	200	200-250
Vegetable dishes	150-200	200-250	250
Soups	50-150	150-200	200-300
Meat patties, quenelles, meat-balls	40-60	65-70	80-90
Vegetable and other garnishings	50-60	70-80	90-100
Compotes (stewed fruit), kissel	50-70	100-150	200

Dishes prepared for children in their second year of life, and to some extent in their third year also, should be mashed, sieved, and minced.

We should like to dwell on certain foods that are either difficult to give, or are not very popular.

Meat. Children younger than one and a half years of age are given meat in the form of cooked meat-balls or steamed quenelles (meat patties); from $1^1/_2$ to 3 years fried quenelles may be offered, children of a more advanced age may be given boiled or stewed meat, roughly minced. Brain, liver, and kidneys should not be given to children younger than three years; besides, they usually do not like these products. Mothers should also be warned against fat cuts of pork and mutton, and against goose and duck meat.

Fat. Lard and suet are not recommended for young children (up to the age of 3 years). The better sorts of margarine, if necessary, may be used for children older than $1^{1}/_{2}$ years provided that it replaces no more than one quarter of the daily fat ration.

Legumes. The use of legumes (peas, lentils, beans) should be restricted, and when given they should be prepared carefully, to avoid digestive trouble.

Sweets must be looked upon as part of the daily ration. Children under 3 years of age should not be given pastries or rich cakes with filling. The only sweets permissible (after meals) are marmalade and marshmallow.

Sausages. Children older than 18 months may occasionally be given positively fresh veal frankfurters or boiled lean sausage.

There is no need for any special discussion of salts, important constituents for the child's growing body, since all salts except sodium chloride (table salt) have been accounted for in the compilation of the above-listed rations. Three to ten g of table salt should be added to the daily food of the child, depending on the type of food and the age of the child.

Vitamins are essential food constituents; the child receives them in fruit or vegetable juices, vegetable dishes (vitamin C), butter, cream, milk, eggs (vitamins A and D), grains, legumes, rye bread (vitamins of the B group).

Proper management of nutrition provides for the normal physical and mental development of the child. Monotonous, unvaried nutrition may be the cause of far-reaching disorders. It is likewise quite obvious that every child has his own individual traits, and therefore these brief recommendations will be supplemented at the children's polyclinic by the local pediatrician who is acquainted with the individual specificity of every child under his supervision.

Physical training, one of the most essential health-promoting measures among the child population, should be given at home, in the pre-school children's establishments, and at school. Only consistent training can yield good results. When properly managed, physical training helps the child in growing up healthy, sturdy, and brave. It is not only a means to attain physical strength, it also helps the formation of positive moral traits in the child's personality, and is a general aid in bringing up children. Every parent wants to make his children physically strong, but not every parent has a proper approach to the problem. Frequently parents are afraid of physical methods of hardening children. Naturally, it must be remembered that the child's body differs from the adult body.

The famous Russian physiologist Ivan Pavlov repeatedly pointed out that the nervous system of the child develops and matures gradually. Changes in physical and mental activity and development of speech depend on the maturity and development of the nervous system. This system regulates the activity of the entire body and its adjustment to environmental conditions (weather, physical loads, etc.).

The human nervous system, particularly in childhood, is easily exhausted; this is due not only to central nervous system changes, but also to the activity of other organs. Children's muscles tire out easily with physical exertion, but their strength is just as easily restored owing to a good blood supply. Children's muscles should not be overstrained, but at the same time the child should not be overprotected against exertion. Parents should remember that growth and development of the muscles and skeleton, and development and strengthening of the central nervous system are closely associated with active motor activity. Prolonged physical inaction leads to inhibition of the physical and mental development of the child. Physical exertions cause a redistribution of the blood which supplies the whole body with nutritive substances and oxygen. Physical exertions intensify blood circulation in the active organs, particularly the muscles and the brain, improve their nutrition, and this is conducive to a physical strengthening of the body. Physical activity increases and improves the work of the heart, lungs, and brain, it is conducive to intensification of metabolism, to a better removal of waste products, improvement of appetite and mood, to sounder sleep, it hardens the child, increases his resistance to diseases. The activity of the child should be variegated. Monotonous physical exertions soon tire him out, and are the cause of bad posture (carriage), as the bones of the child are softer and more pliant than those of adults.

The physical training of the child should be planned in strict accordance with his age and the season of the year. Appropriate periods should be assigned for sleep, meals, outdoor play.

Physical training should be combined with feasible domestic chores. Physical work which is within the child's powers strengthens him, inures him to discipline, teaches him to take care of his things.

A child may start with small manual tasks that help his physical development at a quite early age. Young children are taught to put their playthings away and to help repair toys and books. Children of 6-7 years should be taught to keep their shoes and dress clean and to make their beds. Schoolchildren in the lower grades can help tidy up the house, do the dishes, clean vegetables, rake up rubbish around the house, bring wood and water, help in laying out playgrounds, etc. Senior grade pupils can already do all the manual chores around the house or at school. Manual labour should be encouraged by parents, but it must not be compulsory.

M. I. Kalinin once stated that a disdainful attitude to manual labour is a survival of the past. Overprotective parents who do not let their children perform any manual chores inflict great harm. Children who do no work grow up physically weak and are unprepared for life and its future difficulties.

Physical training of children should be guided by certain rules. The first of them is *gradualness*. Difficult physical exercises should not be introduced immediately. A second important rule is *repetition and regularity*, meaning that physical exercises must be repeated over and over again. The principle of *individualisation* is also just as important. The individual traits of the child must be taken into consideration (physical development, health, age). Medical advice is always necessary.

The child's physical development should be commenced from the very earliest age. The one-month baby is placed, face down, on a firm flat surface. A piece of plywood may be placed in the baby's crib for this purpose. The baby lies in this position for no longer than one minute at first. As soon as he can hold up his head he may be left on his stomach for a longer time. In this position all the muscles gradually become involved in active exercise.

Babies who have lain on their stomachs regularly are earlier to creep, sit, walk.

From the end of the first month of life massage of the baby's body is beneficial, and after two months exercises may be introduced. Exercises and massage are conducive to development of the motor faculties, they harden the body and check the onset of diseases, particularly such diseases as malnutrition, rickets, and pneumonia.

Play is exceptionally important in both physical and mental development. Play occupies the greater part of the wakeful periods in the life of the young child. When playing the child not only improves his health—he also trains his will, learns to subject his own interests to the interests of the group.

Organised group play is a positive educational aid. Common play evolves common interests and teaches children co-ordination. They learn how to behave in a group, their resourcefulness develops, their wits sharpen. Toys are important in the play activity of young children. Toys make play more lively, more interesting. Two- and three-year-olds love to play with a ball and to play "catch"; it is good for them to play with water, sand and blocks, to take apart and put together wooden cones. Between the ages of 3 and 8 years children's games imitate the actions or work of adults. The toys needed for these games are dolls, toy animals, doll carriages, motorcars, airplanes, shovels, pails, brooms, mechanical toys, various building materials. Parents should strive to guide the play so that it helps the child to a correct conception of reality. Adults should try to select games which have a good effect on general development, for instance, motions imitative of motor-cars or airplanes combined with running.

Plays depicting wood-chopping, picking mushrooms or berries are good for the development of the spinal muscles. There are numerous good ball games. Many examples might be cited of imitative games that have a good effect on the physical development of the child; in a group children are rapidly drawn into such games, particularly if grown-ups participate. It must be stressed that adult guidance is needed, and not "playing" for the child. Games and play are particularly good for the health when they are conducted in the open air.

Sledding is a favourite pastime among children. Sledding from low hights (2 m) is recommended for children older than four years. The physical effect is obtained not so much from going downhill as from pulling the sled uphill. The child is at rest going down, but he restores his strength only partially in this manner. Therefore four-year-olds should not be permitted to sled for longer than 30 minutes, seven- and eight-year-olds for 45 minutes, older children—one hour. Heavy sleds are not advisable. Some grown-up should always supervise the sledding; to avoid accidents children should be taught to behave themselves properly when going downhill.

Ski-running may be recommended for children older than 5-6 years, but for no longer than 25 to 30 minutes, as longer runs are too fatiguing. Children of pre-school age should not use ski-sticks, as they frequently try to imitate adults and shift their weight to their arms, which are as yet too weak for carrying such a load. When the child can manage his skis freely he may be permitted to use sticks. At the beginning an older person should show the children the principles of the sport, teach them to move their skis correctly. The skis should be light-weight and their size correspond to the child's age. For pre-school children the proper length is 100-115 cm; schoolchildren use 125 cm skis. Besides ski-running on the grounds surrounding the child's home short cross-country runs should be undertaken. Such outings bring the child closer to nature, show him new things. Never hold a child's hand when he is on skis, this will ruin his posture. School youngsters can undertake longer ski-runs, gradually increasing the distance as skill is acquired. Regular halts for rest are necessary during these excursions. Children of 7-8 years can do 1 to 2 km on skis, for the 9-11 years age group 3 km is a suitable distance, for 12-13 years it is 5 km, for 15 years up to 10 km.

Skating is also a healthy sport that strengthens the child's body. Skating is permissible after the child is six years old. At first he needs the help of an older person on the ice. Both footwear and skates should fit snugly over a woolen sock. Wrong sizes may lead to sprained ligaments.

In the summer walks and hikes should be encouraged. Such excursions are very good for children, providing many new impressions, fresh air, and an opportunity for playing freely. Stops for rest should be called on a dry, elevated place, protected by foliage from the direct rays of the sun. A good camping site is one near a river, where bathing is possible. Here the children can play, bathe, picnic. The time at the camping site should be planned for 2-3 hours. The first one and a half hours are allotted to active games, bathing, making up nature collections, the rest of the time to eating and sleeping. Four-year-olds may already be taken on walking excursions, but the distance should be planned in accordance with age. For children of 3 to 4 years the distance must not exceed 2 km, with a long rest in the middle. Walking speed should not exceed 2 km/h. During the walk one or two short (3 to 5 minutes) stops are made. Children of 5 and 6 years can take 3 km walks, by 7-8 years they manage 4 to 5 km, by 9-11 years 5 to 6 km, by 12-13 years 6 to 8 km, and 14-15-year-olds can participate in 8-10 km hikes. Short stops are made over intervals of 15-40 minutes, depending on the age of the children.

When walking with children younger than 3 years it is advisable to use a harness instead of leading the child by the hand. The harness is a good safeguard against falls. Moreover, when a child is led by the hand he is always in danger of injury to his elbow (sub-spraining of the radius, the smaller of the bones of the forearm) when he stumbles, while with the harness this danger is completely eliminated.

Children love bathing and swimming. Swimming is good for hardening and strengthening the body, and for avoiding future accidents in the water. The child should learn to swim under direct supervision and instruction of an adult. Children are apt to overdo their swimming. It must be remembered that swimming is beneficial only when the child bathes no more than twice a day, and for no longer than 10 to 15 minutes. When the child is well inured to water he may be permitted to swim for 20 minutes.

Before beginning to teach the child to swim he must become accustomed to the water and stop being afraid of it. This is attained by getting the child to play in shallow water, and then teaching him to duck his head under water. Children do this unwillingly, therefore the thing to do is to make a game of the action (sending up bubbles from under water, recovering small objects from the bottom, keeping the eyes open). The following method is recommended for teaching children how to swim. The child goes into the water where it is a bit over his knees and faces the shore. Then he is told to throw himself on the water; even if he does not beat the water with his hands and feet he will reach the shore owing to the force of inertia. When this step has been mastered the child is shown the principal swimming strokes. Swimming should be taught gradually. A child who begins at the age of 4 can already swim a few metres by the time he is 6-7 years old. Never duck a child forcibly, never leave him alone in deep places or splash him with water, as this frightens him and it is then most difficult to teach the child how to swim.

By 8-10 years children may be permitted to row; rowing develops the muscles of the arms, back, legs, chest. The pure, cool air above the surface of the water is also a salubrious factor.

Children of 12 to 15 years old may row over a distance of 4 km when there is no wind and the water is calm.

Practice has shown that children can ride midget bicycles by the age of 6-8 years.

Children older than 10 years can ride normal bicycles, but for no longer than one hour at a time and no further than 10 to 15 km. By seventeen 30 km bicycle outings are already not difficult.

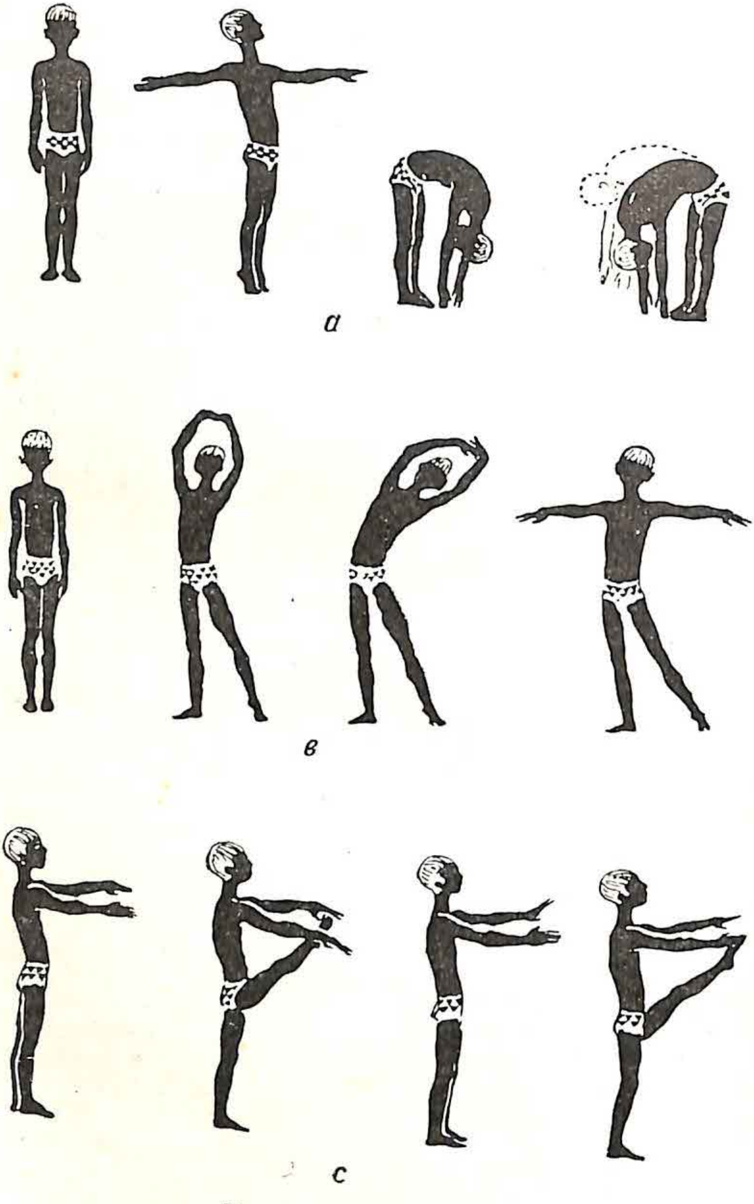

Fig. 1. Setting-up exercises
a — first exercise; *b* — second exercise; *c* — third exercise.

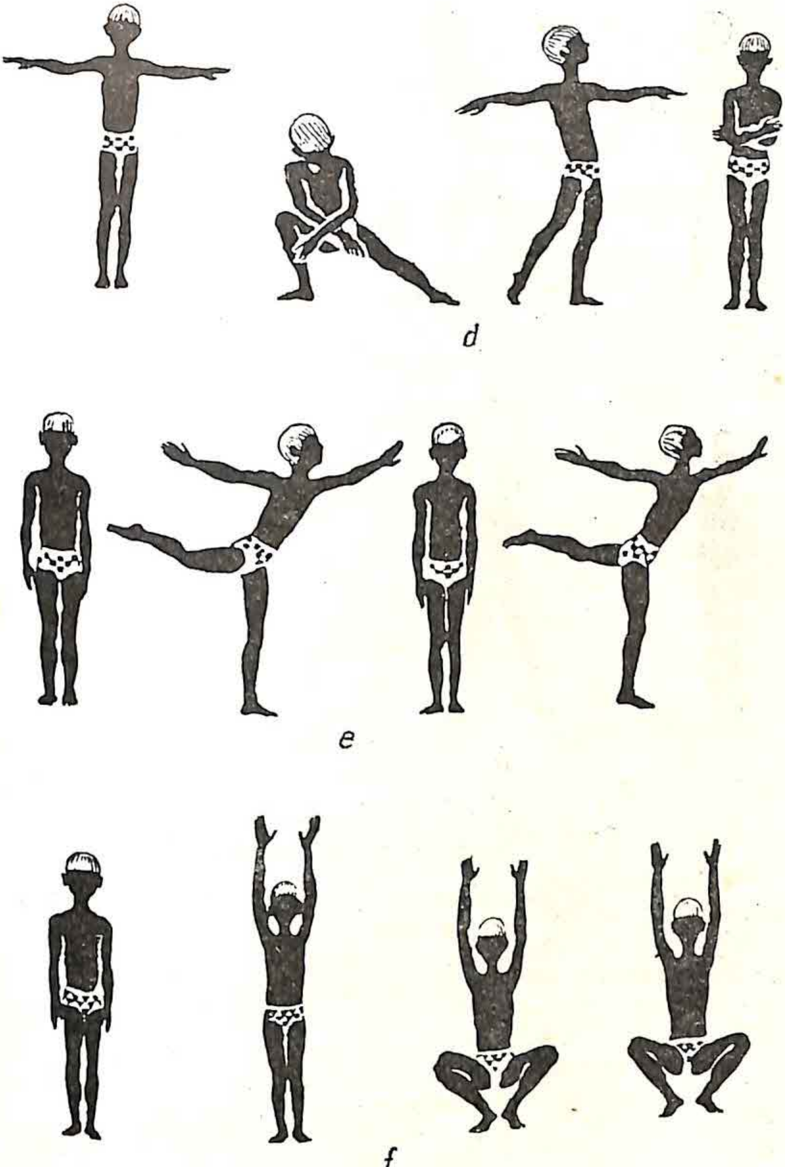

Fig. 1. Continued.

d — fourth exercise; e — fifth exercise; — sixth exercise.

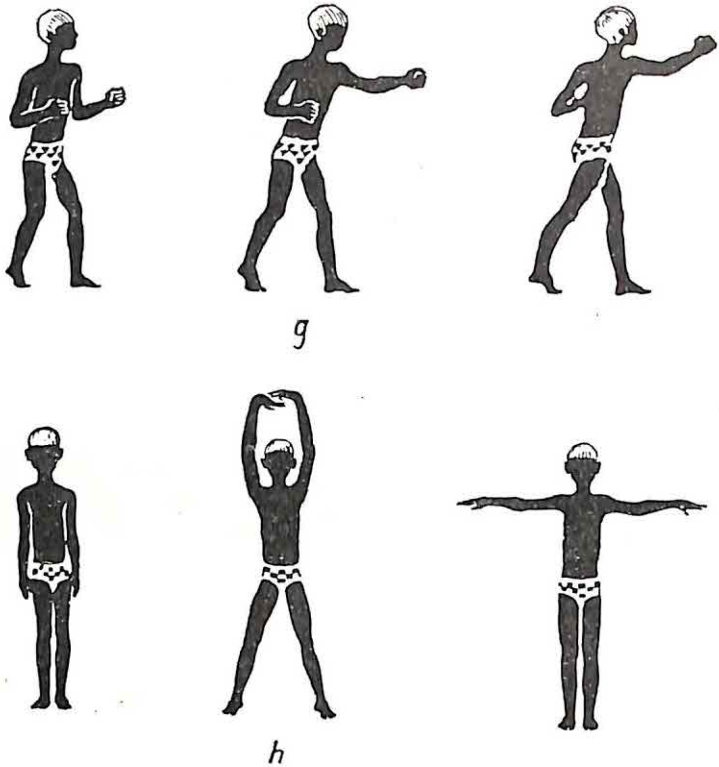

Fig. 1. Continued.
g — seventh exercise; *h* — eighth exercise.

Skipping-rope exercises are also conducive to physical development; they develop dexterity and a feeling of rhythm. The child may begin these exercises at 7-8 years of age. However, rope-skipping takes a lot of energy, therefore games of this kind should be played with intervals, and last for no longer than 40 minutes.

A salubrious and attractive form of physical training for children is the institution of setting-up exercises in the morning, as soon as the child wakes up, beginning with the age of 6-7 years. These exercises are broadcast, with musical accompaniment, at definite hours; however, if these hours are not convenient, some older person may take upon himself the role of instructor. The younger children do only the easier exercises. In winter the window is partially opened (or the transom is opened), in summer the exercises are done out of doors in light clothing (shorts, sports-shirts, gym shoes).

We here set forth a series of setting-up exercises.

Exercise I. Normal starting position (stand at tension).

Performance: arch back as much as possible, raise arms to shoulder height and extend backward as far as possible, palms forward—inhale. Springy forward bend, touching the floor with the tips of the fingers (2 times)—exhale. Return to starting position (Fig. 1*a*). Slow rhythm.

Repeat exercise 3-5 times.

Exercise II. Normal starting position.

Performance: place left foot sideways on toe, raise arms over head, turning palms inward, lock fingers—inhale. Do two springy bends to the left—exhale. Drop straight arms, bring left foot to right. Repeat the exercise for the right side (Fig. 1*b*). Moderate rhythm.

Repeat exercise 4-5 times.

Exercise III. Normal starting position, arms extended forward at shoulder height, palms turned down.

Performance: swing right leg to the left, toe touching left hand, without bending trunk—exhale. Bring right foot to left—inhale. Repeat same exercise for other leg (Fig. 1*c*). Moderate rhythm.

Repeat exercise 4-5 times for each leg.

Exercise IV. Normal starting position.

Performance: raise arms sideways to shoulder level. Lunge to the right with a springy forward bend, cross relaxed arms in front of chest and bend lower—exhale. Straighten trunk, extend hands at shoulder height sideways, move right leg sideways, placing it on toe—inhale. Close feet, cross arms freely in front of chest. Repeat exercise for other leg (Fig. 1*d*). Moderate rhythm.

Repeat exercise 4-5 times.

Exercise V. Normal starting position.

Performance: to the count of "one, two" slowly raise left extended leg backward, raise arms sideways, palms down, to shoulder level, arch back and bend forward (horizontal balance stand). At the count of "three, four" hold balance, at "five, six" slowly return to normal position, "seven, eight"—starting position. Do the same exercise for the right leg. Breathe freely, do not hold the air in (Fig. 1*e*).

Repeat exercise 3-4 times for each leg.

Exercise VI. Normal starting position.

Performance: raise arms sideways to position overhead, squat with knees apart, heels together, holding trunk and head erect. Repeat springy squat, stand up straight and drop arms over sides (Fig. 1*f*). Breathe freely, do not hold the air in. Slow rhythm.

Exercise VII. Starting position: boxer's stance, clenched fists held in front of chest.

Performance: direct forward "punch" alternately with left and right hands (Fig. 1*g*). Do not hold in breath. Rhythm moderate, gradually accelerating.

Punch 16 times.

Exercise VIII. Normal starting position.

Performance: jump, legs apart; raise arms sideways to position overhead, clap hands. Jump, closing feet, bring arms to shoulder level sideways (Fig. 1*h*). Breathe freely, do not hold the air in. Fast rhythm.

Do 30-40 jumps. Walk for 30-40 seconds.

Besides physical training exercises children are also enthusiastic about sports, which they are permitted to start training for at the age of 11-12 years.

Table 3 lists ages at which children are permitted to begin training for various types of sports in special sports schools and voluntary sports societies.

An essential task of physical training is the formation of good posture. The correct position and normal proportions of the separate parts of the body are elements characteristic of good posture. In good posture the shoulders are thrown back, the head held erect, the abdomen drawn in, the chest full, and there is a small forward curve in the lumbar region of the vertebral column. Bad posture is not infrequently formed in childhood, particularly during school years.

Bad posture is associated first of all with deformation of the spinal column caused by prolonged erratic position in standing, walking, or sitting.

The softness of children's bones is conducive to the development of bad posture; their bones are softer owing to a lower mineral salt content as compared with

Table 3

Ages for Beginning Training in Various Fields of Sport
(in years)

Field	Age at which children are accepted for training in preparatory groups of children's sports schools, sections of voluntary sports societies and school sports teams	Duration of training before permittance to participate in competitions	Age at which participation in competitions is permitted
Figure skating	7	2	9
Tennis (lawn)	7-8	1-2	9-10
Acrobatics	7-8	2	9-10
Callisthenics	8	1-2	9-10
Swimming	8	1-2	9-10
Diving	9	2	11
Skiing	11	2	13
Track and Field Athletics	11	2	13
Competitive gymnastics	11	2	13
Speed skating	11	2	13
Volleyball	11	1-2	13-14
Basketball	11	2	13
Gorodki	12	1	13
Field-handball	12	1	13
Soccer-football	12	1	13
Icehockey	12	1	13
Bandy	12	1	13
Fencing	12	1	13
Water polo	13	2	15
Cycling	13	2	15
Rowing	13	2	15
Boxing	14	1	15
Wrestling (Greco-Roman, free-style, SAMBO)	14	1	15
Sailing	14	2	16
Point shooting	14	1	16
Weight lifting	16	1-2	17-18
Motorcycling	16	1	17

adults. Various diseases, particularly rickets, lead to bad posture. Bad posture not only disfigures the child's body—it also affects his health. Posture defects cause respiratory trouble, as the form of the chest always suffers. Posture affects the activity of the abdominal organs.

In order to avoid subsequent bad posture the child should use a chair and table suitable to his size. If the table is too low the child has to bend over, leading to compression of the chest and curvature of the spine (round shoulders).

If a child frequently sits at a table that is too high for him his right shoulder will become higher than the left, and the spine will be curved to the right. At table the child should sit up straight with both shoulders at the same level, and his chest should not press against the edge of the table.

When posture is normal the child should be able to see his toes when standing erect and slightly bending his head forward. If the abdomen and/or the lumbar curve are enlarged the head has to be inclined considerably for the toes to be seen, or even the trunk has to be bent over. Posture may be improved by having the child check himself frequently and bear himself correctly. In all cases of bad posture the advice of a doctor and physical training instructor is necessary.

It must be stressed that bad posture is easily corrected in the early stages of its appearance. As the child grows older his bones become harder, lose their resilience, and correction becomes very difficult.

MASSAGE AND EXERCISES IN EARLY CHILDHOOD

> Physical exercises for infants do not resolve into exercises alone in their narrow sense with all their positive effects on the muscles, blood circulation, respiration, metabolism etc., — they are also an excellent means of rearing the baby.
>
> (*A. Tur*)

In infancy exercises and massage are positive factors in normal physical and mental development, therefore they must be widely employed in order to bring up sound, healthy, uniformly developed children. Infancy is the foundation on which rests the physical status of the population.

The basic purpose of exercises in early childhood is improvement of motor functions by proper training methods, aimed at attaining full volume of motor activity in the joints by means of correct movements. Consequently, exercises for infants include combinations of motor activity involving many groups of muscles and no less than two joints; this corresponds to the usual natural motor activities of the baby: "creeping", "sliding steps", etc. Massage is a mechanical rhythmic stimulation applied regularly to the body. Massage affects the superficial or deeper tissues, depending on its method of application; however, its effect is not limited to the area of the body to which it is applied, it also has a reflex action on the functions of a number of organs and systems and on the body as a whole.

Massage improves tissue metabolism and blood-formation, it intensifies blood circulation and improves tissue nutrition—the skin becomes firm, resilient, its resistance grows, and the tone, resilience and contractility of the muscles increase.

There are five basic techniques in massage: stroking, rubbing, kneading, thumping, and vibration (percussion).

Stroking (Fig. 2) intensifies systemic metabolism, has a sedative effect; when the baby's entire body is stroked regularly it improves his appetite, weight increases more rapidly, and a flabby and apathetic baby becomes livelier and more active.

Kneading (Fig. 3) has a mechanical effect on the deep-lying tissues. In infancy this is particularly beneficial for the muscular tissue, as it intensifies blood circulation and improves tissue nutrition, causing the muscles to grow and their power and contractility to increase, and raising general tonicity.

Tapping improves blood circulation and intensifies muscular nutrition, improving the functions of the deeper-lying organs. This form of massage is indicated only for well-nourished infants.

Vibration is employed less frequently for infants than the other forms, and its application is prevalently for fat, flabby, pasty babies.

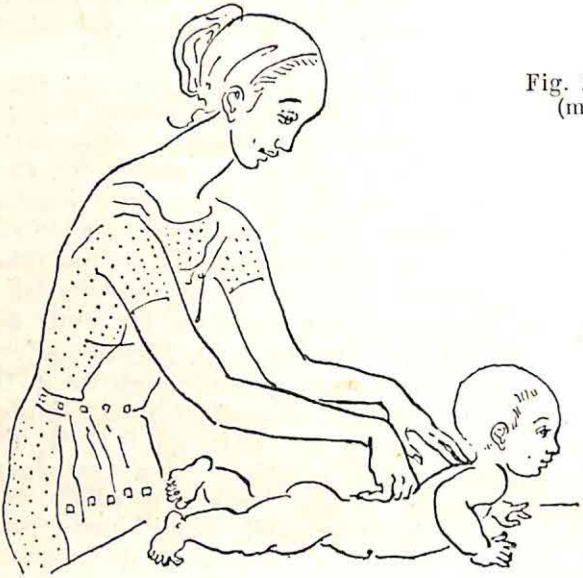

Fig. 2. Stroking (massage).

Direction of massage: on the upper extremities from wrist to shoulder, toward armpit, on lower extremities from foot to groin.

Massage for babies should be done lightly.

When the extremities are massaged they should be held in a position of maximum rest—semi-flexed.

Massage by stroking is the principal form of massage for infants. All physical exercises and massage usually begin and end with stroking.

The above forms of massage are used for babies in combination with physical exercises.

Exercises for infants fall into the following categories:

1. *Passive* exercises performed by specially trained persons (nurse or mother); these exercises utilise the natural motor activity of the child—flexion and extension.

2. *Reflex* exercises conditioned by reflexes appearing in response to stimulation of the sensitive nerve endings

in the skin and muscles (for instance, extension of the spinal column when the fingers are passed over the long muscles of the spine).

3. *Aided* exercises—passive-active movements: pulling the baby upward to a semi-sitting position (Fig. 4), holding him by his bent forearms, etc.

4. *Active* exercises—voluntary movements the baby performs under the direction of the nurse.

Exercises and massage should be conducted in well-aired premises in which the temperature is not lower than 20 °C.

The table used for the exercises should be flat and firm, though not hard (a thick blanket and waterproof pad covered by a diaper are adequate). The most suitable table height is 70 to 75 cm.

The baby is placed on the table (all his clothing is removed). Exercises should not be done earlier than

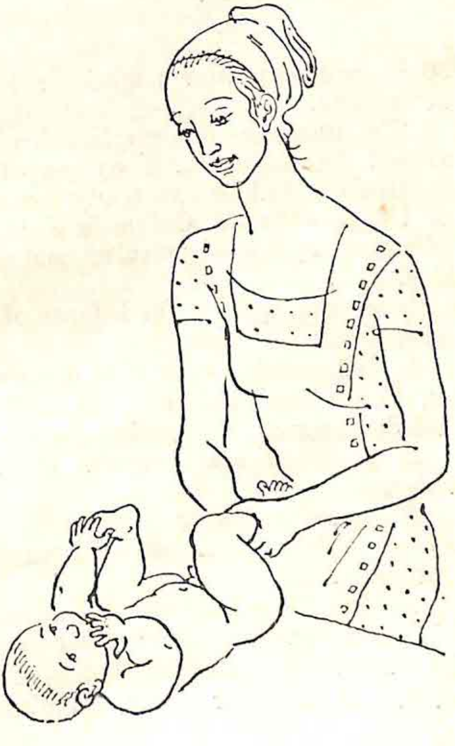

Fig. 3. Kneading (massage).

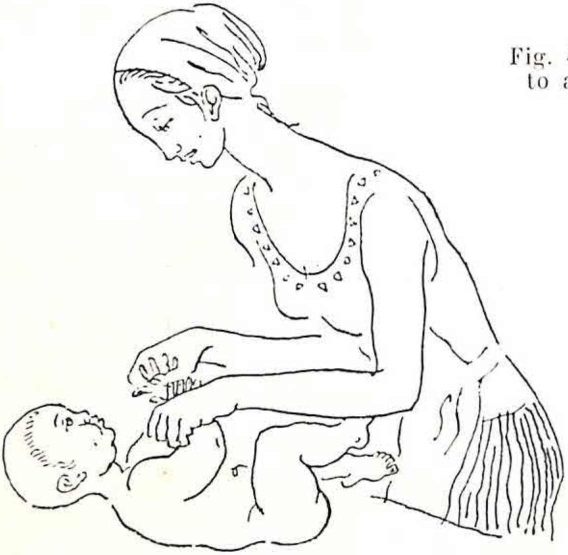

Fig. 4. Drawing up to a semi-sitting position.

30-45 minutes after a meal or later than 30 minutes before one.

The duration of exercises for an infant should not exceed 8-10 minutes. They may be done twice a day.

Healthy babies are ready for massage and exercises at $1^1/_2$ months. M. Gubert and M. Ryss recommend the following cycles of exercises and massage for young babies.

The *first cycle* is for infants of $1^1/_2$ to 3 months. It consists of:

1. Reflex activity associated with extension: (a) stretching the spinal column; (b) reflex creeping; (c) lying face downward; (d) exercises for the feet.
2. Stroking and massage of the arms, legs, back, abdomen.

All passive motor activity is excluded during this period of life, to avoid overstraining the muscles and ligaments.

The *second cycle* is for 3 to 4-month-old infants. During this period passive exercises for the arms are introduced, light kneading exercises, flexion and extension (Fig. 5), massage of the entire body, exercises for the feet, pulling the baby's head back while holding him face downwards, turning him over on his stomach.

The *third cycle* is for babies of 4 to 6 months. Passive exercises for the legs are introduced—flexion and extension, sliding steps (Fig. 6).

The increasing activity of the baby aimed at changing the position of his body (from horizontal to sitting up) calls for the introduction of active exercises (the baby lifts the upper part of his body from a supine position when his outspread arms are held), variegated massage, and all the exercises listed for the preceding cycle (Fig. 7).

The *fourth cycle* (6 to 10 months) includes more complicated exercises for developing motor co-ordination, since at this age a better adjustment has already been established between the functions of the larger muscles and of the fine muscles of the hand.

The baby begins to crawl, sit, stand, and understand what is said to him during this period.

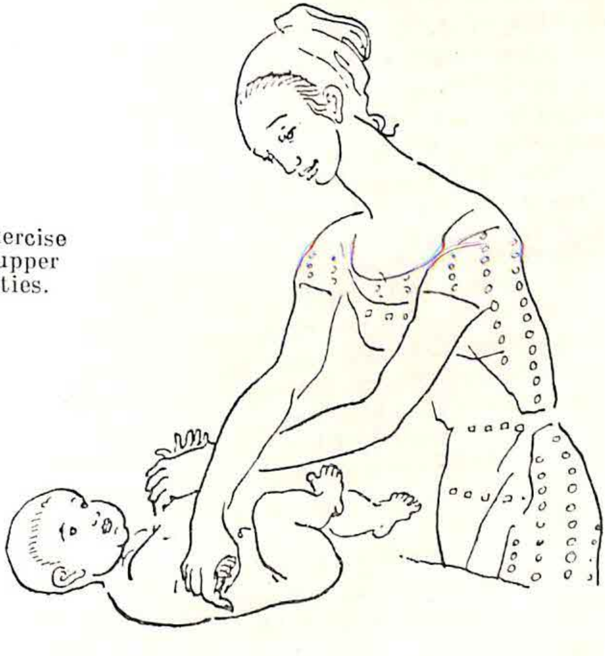

Fig. 5 Exercise for the upper extremities.

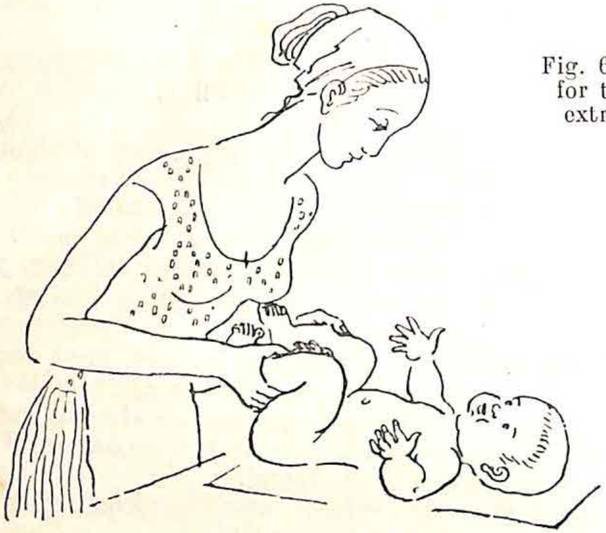

Fig. 6. Exercise for the lower extremities.

Therefore, the other exercises introduced at this time in addition to the ones cited above are stimulation of crawling (Fig. 8), turning the baby over from a supine to prone position (holding his feet), circulatory movements of the arms, raising straight legs, arching the back under tension, squatting, raising the upper part of the body from a prone position when the arms are held.

The *fifth cycle* (10 to 14 months) is applied at the time when the child begins to stand and walk alone and can already squat, when he understands what is said to him; this advanced development calls for a wider scope of physical exercises and starting positions: directed by an adult, the child turns his body, bends and straightens his trunk, raises straight legs to touch a stick, pulls to upright from prone position when held by the arms, takes a squat-stand when held by one arm, squats (with fixed knees) either with or without support, and (if desired) is given some elements of massage.

Children older than 14 months do only active exercises.

In the second year of life the child already walks, can throw a ball at a mark, step over obstacles, and begins to climb up suitable objects. These basic motor abilities should be developed and improved by means of appropriate physical exercises.

At this age the child already understands quite clearly what is said to him, and can therefore comprehend simple verbal directions, such as "sit down", "stand on your toes", "throw the ball", which are also conducive to the development of speech. The equipment used in physical exercises should be of suitable weight and size, corresponding to the age and strength of the child. The exercise period should not be long enough to tire the children (no more than 10-20 minutes) and a good mood should be retained throughout it. Rest pauses are essential.

The number of exercises should be restricted to 10-12.

Walking exercises become more complicated (walking along a low bench, walking up an elevation with obstacles on it to be stepped over); various foot exercises are a good protection against flat-footedness that is frequently observed at this age, and are an aid in developing good posture and the bodyrighting reflex.

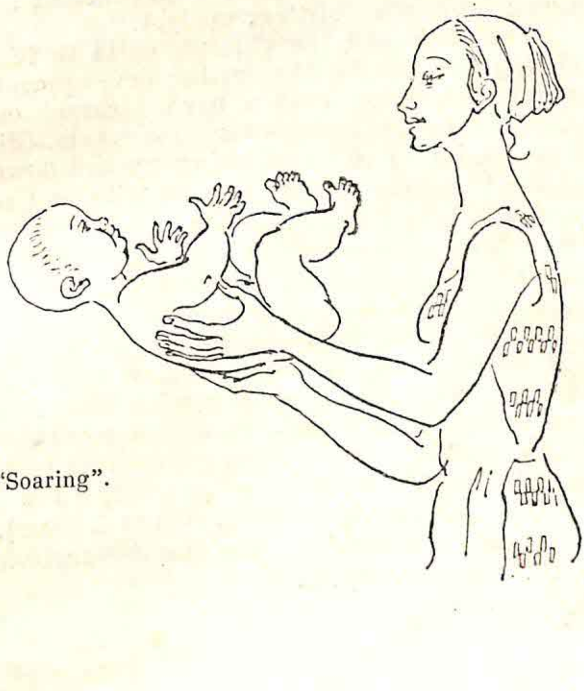

Fig. 7. "Soaring".

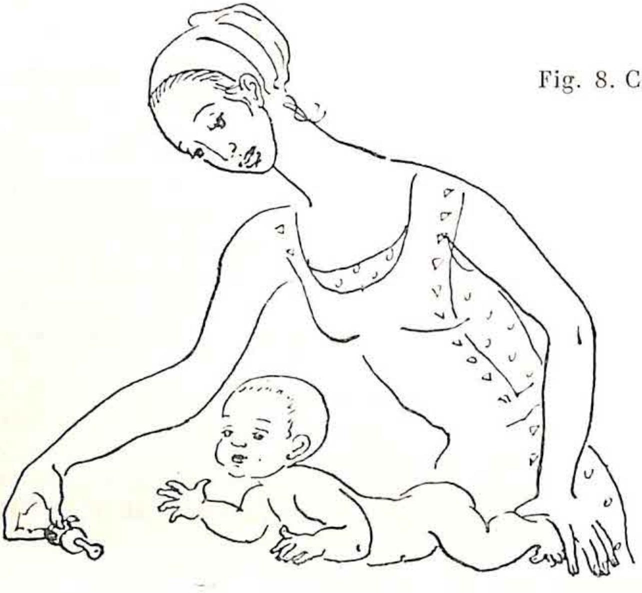

Fig. 8. Creeping.

The exercises commence from different starting positions: horizontal, sitting, upright.

The sixth cycle (for children of 14 to 18 months) includes exercises for the further development of skill in walking—walking over a narrow carpet on the floor, along a board, stepping over an obstacle. Climbing abilities are improved by climbing up and down the ladder of the play-ground slide (chute) with and without support, climbing a double ladder by placing one foot after the other on the same rung or on alternate rungs. Throwing is developed by hitting a mark with large and small balls, and by throwing the balls as far as possible. Exercises for overall development are flexion and extension of the arms in a standing position, with assistance; assuming a semi-sitting position with knees straight, without help; bending and straightening the trunk with knees straight, raising outstretched legs to touch stick; squating with a hoop; crawling under a low bench.

Seventh cycle (from 18 months to 2 years). This cycle repeats all the walking, climbing and throwing exercises of the preceding cycle.

Exercises for overall development include exercises for the arms (flexion and extension, lifting and dropping, circling;) exercises with gym sticks—squatting with support of stick, raising outstretched legs to stick, assuming semi-sitting position with feet fixed, crawling under low bench.

Eighth cycle (for children of 2 to 3 years). This cycle introduces more advanced and complicated walking exercises, climbing and throwing, various arm and hand exercises, squatting with support of stick, raising outstretched legs to stick, assuming semi-sitting position, holding to stick, sitting back on bench with feet closed, crawling under low bench, stepping and jumping over obstacles.

The district doctor or nurse can teach any mother how to massage and exercise her child in the various periods of babyhood and early childhood, and it is the duty of every mother to learn, and to apply this knowledge to the development of her child every day.

Regular and consecutive application of the different forms of massage and physical exercises for babies and young children, the "daily regimen factor" (A. Tur) is conducive to the growth and development of children, and also to the repair of dysfunctions due to previous diseases or unfavourable environmental conditions.

PRINCIPLES OF INURING CHILDREN TO ENVIRONMENT

Some children grow up in sound health and are rarely ill, while others are frequently ill (and often seriously).

What does this depend on?

A number of factors are responsible, among them adaptation to the constantly changing environment. The child's environmental adaptation (to temperature, humidity, draughts, sunshine, atmospheric pressure) begins the day he is born and continues throughout childhood. The central nervous system takes a most prominent place in the adjustment of the body to the surrounding world. This system governs the production of warmth and its emission. However, both the nervous system and neural regulation are not as mature in a small child as they are in adults. Therefore, heat control (thermoregulation) is immature in childhood, particularly in infancy and early childhood. This is the reason why little children are easily affected by cold or become overheated.

From the very first days of life everything should be done to facilitate the process of adaptation of the infant to his environment. Inurement, or environmental conditioning, is an important aid in this.

What is inurement, what are its essential points?

Inurement is a system of measures that harden the body, increasing its resistance to harmful environmental influences, and first of all to changes in temperature. An inured (or hardened) body is more resistant to diseases, particularly to "colds" — catarrhal conditions of the upper respiratory tract, grippe, influenza, sore throat, pneumonia, rheumatic fever, etc. Catching a cold is now understood as a temporary lowering of the body's resistance to infection under the effect of chilling.

Owing to the cold the microbes living in the body become active and cause various diseases. A hardened child is ill less frequently, and when he is ill he tolerates the disease more easily.

The principle of inurement is training the body and its thermoregulating mechanisms by constant stimulation. The surface of our bodies is studded with nerve endings (receptors) which react to the environmental temperature by transmitting the stimulations they receive, along nerve routes, to the brain. The cerebral cortex reacts by sending "orders" for constriction of the blood vessels lying in the skin (if the initial stimulus was that of cold), and thus a decrease of heat emission is attained, while heat formation in the body itself is intensified. The opposite occurs when the skin receptors are stimulated by a high environmental temperature—the blood vessels in the skin are then "ordered" to dilate, the excessive body heat is emitted into the surroundings, and the body cools off. Concomitant perspiration increases heat emission; at the same time the production of heat in the body is lowered.

The regular influence of various temperature stimuli consolidates the connections between the cerebral cortex and the skin receptors, prompting a quicker reaction to oscillations in atmospheric temperature. The better the blood vessels in the skin function, contracting when it is cold, and dilating when it is warm, the better is the body protected against sudden changes of weather.

Natural factors, accessible to all, are utilised for inuring the body; these factors are air, water, sunlight. However, it must be pointed out that the observance of certain conditions is very important. First of all, the inuring procedures must be *regular*; otherwise they will be ineffective. If the procedures are stopped when the child's body has not had time to consolidate the results achieved everything will have to be started anew. Another important thing is *gradualness*. Do not forget that the child is not sufficiently trained yet, and therefore sharp changes in the environment he is accustomed to may be harmful. The child's clothing should be made lighter gradually in the spring, the temperature of his sponging water lowered gradually, etc. It is highly important to begin the inuring process at an *early age* and to continue it throughout the pre-school and school-age periods. Constant *observation* of the child is necessary throughout the hardening procedures; all changes should be checked. This particularly concerns babies and little children.

At early ages children cannot always provide a correct or timely estimation of their sensations. They need a lot of help. One should not become *excessively* enthusiastic over hardening procedures, as the child's body loses heat more easily than that of adult. Medical advice should be taken before starting an inurement course. Only the doctor will be able to judge the individual traits of the child properly, and recommend an adequate selection of hardening procedures and methods. Appropriate utilisation of such powerful natural agents as sun, air and water, in combination with physical exercises harden the child's body, make him strong and healthy, increase his resistance to various diseases. Moreover, hardening develops will-power and is thus an aid in personality formation. Should a child display a negative attitude to inurement his interest in becoming strong and healthy must be tactfully aroused.

Inuring the Body by Exposure to Air

As the temperature of the surrounding air is usually lower than that of the body the air stimulates (by cold) the skin, the mucous membranes of the respiratory passages, and the nerve endings (the receptors). This in its turn provides training exercises for the thermoregulating mechanisms. Thus fresh air increases the resistance of the child's body, hardens it. The child should become accustomed to exposure to fresh air from an early age. Regrettably, many parents still harbour fears of fresh air. Since they are afraid of their children catching cold such parents often keep them indoors and do not air their rooms properly. Mothers are particularly apprehensive about children who tend to have runny noses, influenza, sore throat, bronchitis. They dress these children too warmly, wash their hands and faces with warm water, frequently keep them at home instead of taking them outdoors. Deprived of fresh air, the children become flabby, dull, lose their appetite, and develop anemia. Such "hot-house" conditions increase the child's susceptibility to various "cold" diseases.

What are the elements of inurement by exposure to air?

First of all, the child's room must be aired regularly and thoroughly. In the autumn and winter this should be done no less than 3-4 times a day. The best time is when the child is out of the room—while he is taking his outing. In warm weather the window or transom should be open all the time.

The child should be out of doors in the fresh air *as much as possible*, and not only in the summer, but in the winter as well.

Some parents do not take their babies out of the house in cold weather. Are they right? Of course not! The child must be taken out for a walk both on sunny and cloudy days. Walks are included in the child's daily schedule independent of age. During his outing the child should be dressed suitably, depending on the weather, and both overheating and overcooling should be avoided. Mothers and grandmothers are mostly afraid of overcooling, and therefore they frequently muffle up their children, not understanding that overheating is also harmful and conducive to diseases. When infants are clothed or wrapped excessively and overheated they may develop prickly heat (or heat rash, miliaria rubra), diaper rash, and suppurative vesicles. Winter clothing should be warm, but it must not hamper the child's movements or make it difficult for him to play with other children. A heavily dressed child does not move about much and he gets chilled sooner than children whose clothing is lighter. Moreover, a heavily clothed child gets tired sooner, and perspires.

When may a newborn infant be taken for his first outing, and for how long?

A baby born in the summer may be taken out into the fresh air within several days after birth, provided the atmospheric temperature is not lower than 12 to 15°C, or else the window in his room may be kept open while he sleeps. If the child is born in the cold season of the year he is first taken out in the third or fourth week of life on a day when the atmospheric temperature is no lower than minus 5°C. The infant has to become accustomed to cold air gradually. At first the outings are restricted to a glassed-in porch, or to a room in which the window or transom is open. During the first days these sessions are no longer than 10 minutes, but gradually, over a period of 1-2 weeks, the time is increased to 30-45 minutes.

Babies younger than 2-3 months are taken outdoors when the temperature outside is no lower than minus 10°C. On cold days it is preferable to take the baby out twice a day for 20 to 30 minutes. When it is not so cold the outing may last from 45 minutes to an hour and even more.

Babies 3 to 6 months old may be taken out when the thermometer shows minus 12°C, and by the end of the first year even when it shows minus 15° C. In the winter two walks a day are recommended, the child spending a total of one to three hours out of doors.

Children in their second and third years of life can also be taken out into the air twice a day, and the lowest temperature for children who are already accustomed to cold is minus 15-16°C. In colder climatic zones, where the humidity is low, children may play outside in still colder weather when there is no wind. Children of pre-school and school ages should spend no less than 3 to 4 hours outdoors. Some parents carefully cover their baby's face with the corner of his blanket when they take him out into the street. This should not be done, as the baby does not breathe fresh air when so covered , and the outing becomes useless. Naturally, the child should be protected from wind, for draughts intensify heat emission and may result in the child getting cold. Therefore a place protected from wind should be selected for the walk.

On frosty days when the outdoor temperature is lower than minus 20°C the fresh air session may be managed at home: the baby is dressed as for the street, placed in his crib, moved nearer to the window, and the transom is opened (or the window is partly opened).

In the warm season even very young children should be out in the air the greater part of the day, while preschool and school-age youngsters can be out almost all day. The children should play outside, and their meals and bathing can also be managed out of doors. This is easily done when the child lives in the country or is taken out of town for the summer. Children should be permitted to run about barefoot—this also hardens them. However, the habit of going barefoot must be introduced gradually, as the skin of children's soles is very tender and easily cut and abrased. A child whose summer is spent in the city should walk and play in a park, green square, on a boulevard, or in a courtyard in which trees and flowers grow, away from the dusty and noisy streets.

It is important to take playthings along when the child goes outdoors, to induce him to motor activity, particularly in the cold season. Games should be encouraged. In the winter the children should be provided with brooms, shovels, sleds, and skis, and they should be taught the proper use of these things. When the weather is too bad for going out the child can be taken out on a porch, or into an open shed, or he may be dressed in his street clothes and kept in a room where the window or transom is open. Children often feel cold quite soon after going outside; if this happens the child should be taken indoors earlier than was planned. If the parents have not been able to take the baby out in the daytime he may be taken out in the evening, but should never be deprived of his walk altogether.

As a rule, infants fall asleep as soon as they are taken outside, particularly on cold days. There is no need to be afraid of this. Sleep in the open air is usually sound and peaceful, it has a beneficial effect on the system as a whole and particularly on the nervous system. The duration of sleep in the fresh air depends on the weather and atmospheric temperature, on the age and health of the child. Babies should be trained to sleep in the fresh air gradually. At one and a half to two months of age they should sleep with a transom open, later on a porch, balcony, or in the yard. In Baby Homes and nurseries (crèches) it is advisable to build special shelves under an awning. Folding cots may also be used for this purpuse. In the winter babies are placed in special quilted sleeping-bags (both for outings and naps), and on cold days a quilted blanket is put over the sleeping-bag. If no sleeping-bag is available children older than one year may take their outdoor naps in their coats, with their feet wrapped up carefully in a blanket. The clothing worn while sleeping out of doors should be adapted to the weather, but it must not impede respiration and blood circulation. Weak and ailing children should be covered with particular care. The lowest atmospheric temperature at which trained children of 6 months to 3 years of age may take their naps outdoors in the winter is 10-12°C below zero.

In the summer the baby takes his nap in the shade, wearing a short shirt, and covered with a warm diaper or thin blanket. When the sleeping facilities are properly managed the child awakens from his nap in a cheerful mood, with a good appetite, rosy cheeks, and warm hands and feet. However, if he is restless during his nap, becomes pale or blue, and his hands and feet are cold he should be carried into the house and warmed.

Parents must know that a certain period of time spent daily out of the house is an obligatory condition for the prevention and treatment of rickets, anemia and poor appetite.

Air baths are important in hardening the body; such baths are the mildest method of inurement to environment. In the air the child's skin is exposed to the effect of the atmospheric temperature, the current of the surrounding air, and dispersed solar radiation. As a result his body develops the ability of dilating and constricting the skin vessels depending on heat emission requirements. This form of training protects the child against diseases due to chilling, and is beneficial for both strong and weak children. In the summer air baths are taken in the shade, in inclement weather in a room with open windows. In the cold time of the year this procedure should be carried out in a well-aired room.

When the diapers are changed babies are necessarily left unclothed for some short time. This time should be gradually protracted. Regular air baths may be instituted at the age of 2-3 months. In the summer babies are unclothed and left so in their cribs; on sunny days the crib is placed under a tree, awning, or some other coverage in a spot well-protected against wind and dust. The child should be turned over several times to expose the entire surface of his body to the air. It is best to combine air baths with motor activity. Thus, for younger infants air baths may be combined with massage and physical exercises, while babies of six months and older may play in their play-pens or cribs. Children over one year of age should be permitted to run about and play, dressed only in light sun suits or shorts. In the winter it is good to combine air baths for older children with their morning exercises.

The air bath should be discontinued at the appearance of signs of overcooling ("goose-flesh", chills, shivering) or weakness. Such developments are usually indications of excessive exposure, or too low environmental temperature. After his air bath the child should be cheerful and active. If he becomes flabby and troublesome it is better to drop the procedure for a while.

At what atmospheric temperature are air baths taken?

For nursing infants the temperature, both in the room or out-of-doors, should be no less than 22°C. After the baby has become used to the procedure it may be carried out at 20°C. For children of one and a half years and older the temperature at which they are first exposed to the air should be no lower than 20°C, but subsequently 18°C is sufficient. Children of a more advanced age can take air baths at even 15° and 16°C.

In conducting air bath procedures it must not be forgotten that only gradual changes in conditions are permissible. Caution is needed with the first air baths. Their duration should not exceed 2-3 minutes for children in their first year of life, and 3-5 minutes for 2 and 3-year-olds. Subsequently the duration of the air bath is prolonged, reaching 30 minutes for children in their first year of life, and 45 to 60 minutes for children in their second and third years. It is desirable to give two air baths of equal duration, in the morning and evening. Older children can be out in the air for the greater part of the day wearing only sun suits or trunks.

The most favourable time for the conduction of air baths in the summer is during the hours between 8 a.m. and 6 p.m. A very good time is directly following the afternoon nap. It is good to shower or sponge the child after his air bath. When the air bath is combined with sunning it should be given either before or after the sunning.

Air baths must not be given earlier than two hours after the midday meal or one hour after breakfast. Air baths are contraindicated for very weak and feverish children. Excitable, nervous children are benefited by exposure to the air for 8-10 minutes before going to bed; no physical exertions at all are permitted during this period. The child's sleep becomes sounder and more peaceful after such procedures.

Inuring the Body by Exposure to Sun

The sun is the source of life on earth. Solar energy in the form of ultraviolet and heat rays hardens the child's body. Solar radiation improves sleep, disposition, composition of the blood, metabolism. The skin acquires higher resistance against external harmfulness, reacts more easily to heat exchange. Ultraviolet rays increase the resistance of the organism and are an important agent for preventing and curing rickets as they cause the body to produce vitamin D, the antirachitic factor.

Sun baths (sunning). Sun rays are a powerful agent that may have a harmful effect instead of a good one if misused. When the body is exposed to the sun a great volume of heat rays affects it, and overheating may occur. Overheating, in its turn, lowers the resistance of the child's body and is conducive to diarrhea and vomiting. Excessive exposure to the sun evokes dizziness, weakness, sleeplessness, loss of appetite, headache, increases excitability and the rate of the heart beats, leads to weight losses, and also causes sunburns. Sunburns are very dangerous, they may cause the bodily temperature to go up to 40°C. Children should not be permitted to stay out in the sun for long dressed only in trunks or shorts; however, one frequently sees even very young children staying out on the beach together with adults for hours on a time. It must be pointed out that excessive sunning has a harmful effect on the child.

Medical advice should be taken before beginning sun baths. Sunning is not recommended on an empty stomach or earlier than one hour after breakfast. Do not feed the child immediately following his sun bath. When there are no contraindications for sun baths, a preliminary week of air baths alone is desirable. The best time for sun baths in the northern latitudes of the Soviet Union is between 10 and 12 o'clock in the morning, when ultraviolet radiation is most intensive. Sun baths are taken once a day. Sun baths are not to be confused with the time the child spends playing or walking in the sun, when only oblique rays reach him. Healthy children may begin sun baths in their second year of life. The same gradualness must be observed in sun baths as in air baths, and still greater caution is needed. The permissible sunning time is not the same for all children. It depends on age and health, on geographic and climatic conditions, and on time of the day. A child who has already been taking sun baths for a number of years is less sensitive to insolation. These points are all taken into consideration by the doctor when he recommends sun baths.

Sun baths may be taken when the thermometer shows no less than 18°C in the shade. The duration of the first bath should be no longer than 2 minutes. The child lies on his stomach for one minute and on his back for the other minute. After a day or two one minute is added for each side; the total duration of the sun bath for children of 1 to 3 years of age is gradually brought up to 20 minutes. For older children it may reach 45-60 minutes. The complete course of sun treatment must not exceed 20 to 25 sun baths. During the procedure the child lies completely unclothed on a cot, special shelf, mat, or on the sand. The entire body must be exposed to the sun evenly, while the head is protected by a tent, awning, white panama, sunshade, or kerchief. A vizor is recommended for shielding the eyes. If the child becomes restless the sun bath may be continued in a sitting position, but the child must be instructed to turn about. Children must not be allowed to sleep while taking a sun bath, and in general their condition must be watched; they should be offered drinks of boiled water regularly. After the sun bath is over the child is taken into the shade for a short time and showered or sponged with water (36-28°C). The best place for sun baths for older children is the bank of a river or the seashore, directly before bathing. The children must not be left alone during their sun baths. Limpness, flushed face, excessive perspiration and headache appearing during the sun bath are a signal to end it. If a child complains of headache, dizziness, sleeplessness, and excitability after sun baths the procedure should be discontinued for a time. Contraindications for sun baths are general indisposition, increased nervous excitability, emaciation, malaria, tuberculosis, diarrhea, and also various cardiovascular diseases. These conditions may be considerably aggravated by sun baths; the latter likewise exacerbate many other diseases.

Inuring the Body by Means of Water

Various types of ablutions are simple and powerful agents that harden the child's body. Water affects thermoregulation more intensely than does air of the same temperature, as the heat conductivity of water is 28 times greater than that of air. Consequently, water deprives the body of much more heat than air does. The importance of water inurement may be illustrated by the following example. A person who accidentally wets his feet in cold water soon develops a running nose, or even some respiratory trouble. However, a person who regularly washes his feet in cool water becomes adapted to such temperature changes. The mucous membranes of the respiratory tract of such a person will not react ture of the water may gradually be lowered to 26-25°C. Children of pre-school age may be sponged with 33-32°C water at first then the water is gradually brought down to room temperature. However, 17-16°C is the coolest sponging water permissible. When the sponging procedures are discontinued for some reason or other and then resumed, the temperature of the water after this break must be the same as for the last procedure taken. If the break is very long water of a higher temperature is used at first.

Sponging and rubbing down are recommended for both summer and winter. The best time is in the morning, when the child's body is still warm after sleep. The technique is simple—a wet piece of flannel, or a cloth glove made of Turkish towelling, or the end of a towel are used. These objects must, of course, be clean. The cloth is dipped in water, wrung out, and the child is rapidly sponged, beginning with the neck and ending with the feet. After this he is wrapped up in a large towel and rubbed dry until he is warm and his skin becomes a light pink. The skin must not be moist long—the whole sponging procedure should take only 3 to 4 minutes. The child should not be sponged if he is covered with "goose-flesh"; weak and feverish children are not sponged either. After the sponging the child is put into his bed for a 10-15 minute rest.

Showers (*or rinses*) are a powerful body-hardening agent. They should be started when the baby is one year old; and daily showers be given no earlier than at the age of one and a half years. In the hot season even nursing infants may be rinsed down, as such procedures, besides possessing inuring properties, are also a means of avoiding harmful overheating. In the cold seasons showers are commenced after the child has first become accustomed to sponging. In the summer months showers may be commenced without preliminary rub-downs. In the winter the best time for the shower is in the morning after the child gets up, in the summer—following an air or sun bath. In the winter it is more convenient to rinse or shower the child in the bathroom; if there is no shower a rubber pipe with a shower-head may be attached to the faucet. The room temperature should be no lower than 19-18°C. In the summer showers are given, as a rule, out of doors, when the temperature is no less than 18°C in the shade. It is desirable to fix up a special shower booth, where the child will be protected from the wind. During the shower the stream of water should not fall on the child's head; the height from which the water falls on a child younger than 3 years must not exceed 20 cm. For children of pre-school age this height may be 25 to 50 cm, if the pressure of the water is not too high. First the shoulders are sprinkled with water, then the chest, abdomen, and back. After the shower the skin is thoroughly dried and vigorously rubbed. Before beginning the shower the child should be permitted to touch the water with his hand, to convince him that there is nothing unusual about it.

The temperature of the shower-water, like that of the water used for sponging, is also gradually lowered. At first 36-35°C water is used; in 2-3 days the temperature may be lowered one degree and then gradually decreased to 28-26°C for children in their second year of life, and to 26-24°C for children in their third year. For pre-school-agers the temperature may be brought down to 22-20°C, and for 6-8-year-olds even to 18°C. The duration of the shower should not exceed 1 to 2 minutes. One must take into account the child's sensations during the shower and not hurry about using cooler water (table 4).

No soap should be used when showering or sponging the child, as a too frequent application of soap dries the skin. It is desirable to continue showers in the winter after they have been given regularly in the summer. Showers, like sponging, are contraindicated for very weak or feverish children.

Outdoor bathing. In the summer a very salubrious effect is attained by bathing in rivers, lakes, or the sea.

Outdoor bathing has a most powerful effect on the entire organism. This form of inurement of the body includes the effects of sun, air, water, and physical activity. However, when the bathing is not conducted properly its effect may be harmful. Bathing should be started after the child has first been rinsed down or showered for several days in a row. Bathing in rivers or lake is not permitted before the age of 2 years, i.e., before

Table 4

Approximate Schedules for Air Baths, Sun Baths, and Showers
(given under medical supervision)

Age 3 to 6 months, 20-22°C in shade			Age 6 to 18 months, 18-20°C in shade		
Order of days	Duration of air bath in mins	Temperature of water used for shower or rinse (°C)	Duration of air bath in mins	Duration of sun bath in mins	Temperature of water used for shower or rinse (°C)
1st	1	36	2	2	36
2nd	2	36	4	2	36
3rd	3	36	6	2	36
4th	4	36	8	4	35
5th	5	35	10	4	35
6th	5	35	10	4	35
7th	6	35	12	6	34
8th	6	35	12	6	34
9th	7	34	14	6	34
10th	7	34	14	8	33
11th	8	34	16	8	33
12th	8	34	16	8	33
13th	9	33	18	10	32
14th	9	33	18	10	32
15th	10	33	20	10	32
16th	10	33	20	12	31
17th	11	32	22	12	31
18th	11	32	22	12	31
19th	12	32	24	14	30
20th	12	32	24	14	30
21st	13	31	26	16	30
22nd	13	31	26	16	29
23rd	14	31	28	18	29
24th	14	31	28	18	29
25th	15	30	30	20	28
26th	15	30	30	20	28
27th	15	30	30	20	28
28th	15	30	30	30	28
29th	15	30	30	30	28
30th	15	30	30	30	28

continue as on 30th day.

the child has learned to walk well enough. Bathing should be done in places where the current is slow, the bed of the river or lake is sandy, and the water reaches approximately only to the children's knees. Bathing is not to be allowed in dirty water, or near places where cattle drink and bathe. The mother or nurse must be in the water with the child. Children should not be permitted to enter the water when they are cold—they must first be warmed up by exercise or games. However, it is just as dangerous for children to go in when they are overheated. The skin should be warm, but not sweaty. In the water the child should be taught to move about as much as possible. With movement even cold water is tolerated more easily. After bathing the child is rapidly rubbed dry, dressed and taken to rest in the shade. Sun baths are impermissible after bathing. Bathing on an empty stomach or earlier than 1 to $1^1/_2$ hours after a meal is not recommended. Bathing once a day is enough for children of pre-school age; healthy schoolchildren may bathe twice a day over a 3 to 4-hour interval. The child should at first stay in the water for only 3 to 5 minutes, later the bathing period is increased to 8-10 minutes. Long bathing spells, until the child becomes blue, are harmful. Excessive bathing, especially in the sea, can only have a deteriorating effect on the health. The temperature of the surrounding air should be no lower than 28-25°C, and the temperature of the water for young children no lower than 24-22°C, for older children 22 to 20°C is permissible. The best time for bathing is the late afternoon, particularly after 4 o'clock, as the water is warmest at this time. Children should be taught to swim at the age of 5 or 6 years.

The child should be closely looked after while he is bathing. Upon the appearance of signs of pallor, blue lips, or trembling he must be taken out of the water immediately. Bathing is contraindicated for emaciated, anemic children or for children with cardiovascular disorders, kidney trouble, active TB, epilepsy, or certain other diseases. Consequently, medical advice is necessary before the child is allowed to begin outdoor bathing.

The greatest effect is obtained with sea-baths. Besides the effects of temperature and mechanical irritation sea water also has a chemical effect. Children younger than 3 years of age are not permitted to bathe in the sea. The course of sea bath procedures is 20 to 25 per month. Sea bathing rules are the same as for bathing in fresh water.

The above short exposition of body inurement factors shows that they must be given a definite place in every child's daily schedule. The wide range of hardening agents acting in the summer (air, sun, water) have a good effect on children, and it is extremely important to consolidate this good effect in the subsequent seasons, continuing the application of accessible agents.

Parents should follow the doctor's advice and harden the bodies of their children from an early age by expedient and systematic measures. This will help us to raise healthy, brave, and sturdy children.

EDUCATIONAL APPROACH TO CHILDREN

> Bringing up children is the most important field of our life...
>
> Good upbringing is the pledge of our happy old age, bad upbringing is our future sorrow, our guilt before other people, before the entire land.
>
> (*A. Makarenko*)

The formation of an individual, of his personality and his social behaviour continues throughout childhood and depends completely on the environment of the growing and developing person.

Babies are helpless creatures at birth. Their prolonged helplessness creates the necessity of a prolonged period of care for them, of constant attention and aid, things that, naturally, can only be provided by the parents.

For a number of years the child is the object of loving care in the family, he comes into close contact with his elders; thus he is provided with the opportunity of mastering, by means of imitation and learning, the abilities and language necessary for his subsequent life. The child's upbringing and his development are indivisible. There can be no proper development without proper training and education, but, at the same time, only normally developed children can be brought up normally. It is the task of parents and teachers to bring the child up from what he is to what he should be.

Training and education have an exceptionally great effect on the child.

Everything and anything in the environment that affects the young child (surrounding nature, domestic conditions, family habits and, in particular, systematic instruction) are conducive to the formation of new qualities in the child.

From an early age the child imbibes everything he sees and hears around him, as he is extremely liable to suggestion and very yielding to all manner of influences, both good and bad.

Parents should always bear in mind the words of the famous Russian teacher K. Ushinsky: "If we want a child to be brought up well in all respects we must be well-acquainted with all the aspects of his nature". Some parents do not realise the importance of this idea, therefore they make no attempt to penetrate into the child's world, to understand his interests and needs, and by acting thus all their efforts and warm love are of no avail in bringing up their children properly. Moreover, many parents make the frequent mistake of underestimating the immense importance of the early years of the child's life in his subsequent development and training. Hence the problem of training the child at an early age is a particularly responsible one, since the child's pliancy is manifested in equal degrees in response to good and to bad methods, and frequently both positive and negative influences leave traces that last throughout life.

Many of the personality traits of adults have their source in early childhood.

The principal elements of human personality are founded in early childhood.

A child should be taught to finish whatever he has started doing (put his toys away, look at all the pictures in a book), to be able to concentrate on one thing, to play without bothering others, to be brave about some little unpleasantness (not to cry even when it hurts), to overcome his desires if they are unfeasible at the moment, to wait patiently and so forth. Overprotected children are different: they are not capable of playing by themselves, they constantly demand the attentions of grown-ups, the slightest injury provokes loud and prolonged screaming, they are excitable, and they frequently voice protest against what is proposed by their elders. Even some small difficulty finds such a child at a loss: "I can't", "I don't know how", and he demands assistance.

A normally developing child is mostly attracted by some type of activity in which he himself can be active. Therefore it is frequently observed that a child who has been deprived of his independence during meals is a very poor eater, and the adults around him resort to all manner of tricks in order to make him eat. But give him a spoon, and he will be carried away by the action of eating, and will finish his dish with pleasure. A child should start learning to feed himself when he is one year old. By 15 months he may already be trying to eat independently. And how much more interest can be derived out of washing up when the child himself is permitted to soap and rinse his hands! This is much more gratifying to the child than when somebody does everything for him.

The child's efforts to be independent should be supported by his parents, but he has to be taught how to do things properly—how to hold a spoon, take off his stockings, wash his hands, thank people, put toys away. This early independence is the source of an urge to be independent in the solution of more complicated problems in later life and not call on the help of other people when a thing can be done without such aid. To have a child bladder- and bowel-trained by the time he is 18 months old he should be placed on his chamber or toilet-chair at regular times for a bowel movement or for passing water; this training should be started when the child sits up alone.

To train a child to be neat and clean his surroundings should always be clean and orderly in all respects: the child should always be dressed neatly, washed, his hair cut properly, he should always have a handkerchief and be able to use it. When something is untidy the parent (or other person who takes care of the child) should draw the child's attention to it and propose that he himself put it in order. It is a good idea to show the child his dirty hands or face before washing them, and then again afterwards.

Children easily learn good manners, but they have to be constantly practised in everyday life. If the child always washes his hands before a meal, then the mere words "we are going to eat now" will make him run to wash his hands.

It is possible to begin to cultivate the esthetic feelings of the child, his understanding of beauty, when he is about three years old. The child's attention should be drawn to his own and other children's clean and pretty dresses, and the beauty of nature should be pointed out to him; this develops esthetic emotions and esthetic training.

By showing the child that we are disgusted by dirt, disorder, untidiness, and that we like cleanliness and order we gradually teach him to be clean and neat himself.

Grown-ups are frequently mistaken when they think that the child is still too small to understand and therefore permit themselves to do and say things in his presence that are undesirable in the child's behaviour. For instance, children are very sensitive to the relationships between their parents. The child loves both his father and mother, therefore even a very young child is deeply troubled by quarrels between his parents. In the case of an only child the parents should make arrangement for their child to meet and play with other children of his age; this will teach him to be conceding to others, as an only child always feels himself to be the hub of the family. Only children are frequently over-protected and over-cared for, and in relations with other children they are apt to be selfish, take away their toys, and take offence easily when they have to give in to others.

A negative effect on the child's personality is produced by a variance of opinion on the proper approach of the grown-up members of the family toward him; for instance, the father may be too strict, and the mother too lenient, or one part of the family takes one line with the child, the other part another line.

Children are also irritated by uneven behaviour toward them: today they are told to act thus, tomorrow—

otherwise, now they receive affection, a little later they are loudly scolded. This is frequently the case in families where the adult members cannot always control their own conduct. Such parents should try to improve, to teach themselves self-control.

Frequently a young child is permitted to do whatever enters his head: he throws things about, spits, litters the floor—everything seems charming to the parents. The bad habits become fixed and then the parents suddenly turn strict—what was formerly permissible and only made the mother smile is now forbidden, the mother gets angry, and sometimes even spanks the child. However, it is no easy task to change what has become habitual, to inhibit some previously permitted action just by the word "no"; it is not easy on the nervous system of the child, and it may make him aggressive and stubborn.

The whole rhythm of the child's life, his daily routine, must follow a strict schedule. When a person is accustomed to work at a definite time, to have his meals and go to sleep on time, and not just fritter his time away—such a person will be more organized and efficient in his subsequent life. Nervous children are often full of various fears, originating in threats uttered by adults.

Never try to overcome the child's fears by stringent measures such as punishment or force. Speak kindly, explain what the frightening object or sound is, get the child used to it gradually.

Extreme balkiness is frequently observed, the child becoming so "negativistic" that he always wants to do just the opposite of what he is told to do.

Such children should not be nagged or ordered around too much. Proposals should be made in a matter-of-fact tone, and the child's attention should be diverted to something else. All injunctions must be substantiated and unwavering. The child must learn at an early age that some things may be done, while others are forbidden, and he should not be forbidden too frequently to do things that may safely be done; in such cases the child usually develops a feeling of protest and contrariness.

For its normal functioning the child's nervous system requires sufficient sleep in customary, peaceful surroundings, without rocking or force. The child should be in a calm mood before he is put to bed; a short walk in the fresh air is very beneficial in this respect.

Parents must always remember that their manner to the child must always be controlled, firm, and reasonable if they want him to grow up into a composed and well-balanced individual. Children often feel the tone of voice better than they understand the words said, and react better to it.

In industrious families, where the grown-ups like to perform manual chores and teach their children to work, the children also grow up industrious.

Inert children should be given chores associated with mobile activity, while a nervous, lively child should be given something that has to be done quietly. An absent-minded child should be given a task calling for concentration.

The happiness of creative achievement makes work a pleasure, and therefore children of all ages must be taught to finish anything they undertake.

To bring children up to be good-tempered people their parents should try to raise them in a genial atmosphere, they should be able to understand and share the child's joys and keep him in good spirits.

Parenthood is a responsibility to society and the nation, and people must be aware of this responsibility and strive for a conscientious performance of their duty as parents.

Part Four

MOST FREQUENT DISEASES OF CHILDHOOD

NEUROSES IN CHILDREN

The state of the nervous system is a reflection of the state of the body as a whole, of the behaviour pattern and social acceptibility of an individual.

Neuroses (or psychoneurotic disorders) are transient disturbances manifested by changes in disposition, reactivity and behaviour.

Numerous neurotic symptoms have been known for a long time, and various forms of neuroses have been described, but their causes and nature were not clear. Only after the advent of the works of the famous Russian physiologist Ivan Pavlov did it become possible to study manifestations of psychic activity, to clarify the true nature of neuroses and outline correctly the course of their treatment.

We now know that neuroses are caused by the effect of various unfavourable agents on the cerebral cortex, and that cerebral activity is disturbed in neurotic conditions.

Pavlov was the first to establish that the brain cortex is the scene of two constant simultaneous processes—excitation and inhibition. In sound psychic conditions both processes are strong enough to counteract each other and maintain a normal balance, and are also sufficiently mobile for rapid reactions to changing conditions. The work capacity of the nerve cells in the cerebral cortex is limited, so that overexcitation, overinhibition, or simultaneous overstimulation of both processes or of their mobility may disrupt brain activity; under certain conditions such disruption results in a neurosis.

Pavlov also proved that individual work capacity and endurance of the cerebral cortex differ in various types of nervous activity.

There are individuals of the strong type, in whom both cerebral processes are intensive, and individuals of the weak type in whom both processes are weak.

The type of a person's higher nervous activity develops under the influence of environment and training, although the inborn traits of the brain cortex are also very important. A person with an inborn strong type of nervous activity may become unbalanced or inactive owing to faulty upbringing. Unbalanced persons are particularly incompetent in meeting the exigencies of life, and they are frequently subject to nervous activity failure, that is, neuroses.

The formation of psychoneurotic disorders is closely related to a person's type of nervous activity. It is true that neuroses may develop in people of any type, but only extremely strong stimulation evokes such conditions in the well-balanced and mobile type and such people usually overcome the disorder rapidly. In people of the weak nervous type, or of a strong but unbalanced type, psychoneurotic disorders may be caused by lesser stimulation and be of a graver and more protracted nature.

It is very important to know all these things in order to be able to comprehend the development of neurotic conditions, and to understand why one and the same cause precipitates a neurosis in one child and does not affect, or only slightly affects, another.

It has been established that psychoneurotic disorders are formed in children more easily than in adults; this is chiefly due to the immaturity of the cerebral cortex and the weakness of inhibitory processes in the cortex, and also to the undeterminate typological features of children. Moreover, it is a medical fact that children easily pass into peculiar conditions called "phasic states". In these states the ratio between the force of the stimulant and the reciprocal reaction is unbalanced: the cerebral cortex no longer responds to strong stimuli with a strong reaction and to weak stimuli with a weak reaction; its response is the same for all stimuli, or it may even respond more actively to a weak stimulus than to a strong one. Sometimes the cortical reactions of children may become completely inverted: a positive stimulus provokes a negative response, and a negative stimulus a positive response.

In these latter instances the parents observe that their child has become "disobedient" and "contrary". The child can only be got to do what is wanted of him by being told to do just the opposite. For instance, if the parents want him to eat they say "don't eat", or if they want him to go for a walk they say "don't you dare go out".

The causes precipitating the formation of neuroses may be quite diversified, in some cases multiple. Many emotional impacts may prove excessive and have a weakening effect on the brain cortex. Grief and disturbing emotions may lead to a neurosis; deterioration of material welfare and domestic conditions are conducive to nervous disorders; disease, particularly of a chronic nature, skull injuries, and physical inferiority are often the cause of neurotic conditions.

However, even physically healthy children who have the warm love and care of their parents and family may become subject to neuroses.

In these instances the neurosis is precipitated by a badly organised environment and frequently also by faulty upbringing.

It is highly important to reveal these causes; many of them are removable, and their elimination will help to avoid the development of a neurosis or will facilitate its cure.

Faulty management of the child is often conducive to the development of a neurosis, as bad management and training may overstrain the nervous system, lead to an imperfect development of inhibitory processes and of socially acceptible conduct; bad examples set by people with whom the child comes into contact are important neurosal factors, and neuroses are particularly frequent among children reared by nervous people.

Children may be affected by a neurosis at any age, but it is most frequently observed between the ages of 2 and 4, 7 and 8, and during the period of puberty development owing to number of specific features of physical development during these stages of childhood. Different causes of neuroses are predominant in the different stages of childhood, and a certain age specificity of these conditions has been noted.

Even infants may exhibit nervous tension. There was a time when it was believed that early neuroses were inborn. This point of view has since been abandoned, and it is now well known that all neuroses are acquired, whatever the child's age. Cortical processes are very weak in the brain of infants, therefore environmental stimulation affects their cerebral cortex intensely. The baby tires very quickly, consequently he needs a lot of sleep and peaceful surroundings in his waking hours.

It is not uncommon for the grown-ups of a family, particularly when there are several of them, to stimulate the baby too much during his wakeful periods by excessive attention: they pick him up frequently, talk to him too much, make all sort of noises, or disrupt his feeding and sleep schedules. All this is conducive to overexcitation; the baby becomes fretful and noisy, does not sleep enough, sometimes sleeps in the daytime and is wakeful at night, often twitches in his sleep. The appetite of overexcited children is frequently impaired, sometimes they regurgitate (spit up) or vomit. A point to keep in mind is that lack of appetite may develop in children of any age owing to reasons other than a neurosis. The appetite is frequently poor when the child is ill or weak, and particularly when feeding schedules are not observed. Parents often overload their children with food, giving more than they require, or giving food of a too high caloric value, and too much butter. Butter is often given immoderately in all dishes, or even in lumps, and this deteriorates appetite immensely. Parents frequently use force when the child does not feel like eating, and this precipitates vomiting. Sometimes the attention of the child is distracted from his food by toys, pictures, or talk, so that he eats without noticing that he is doing so. This impairs the appetite still more, since the mere look of the food should induce secretion of gastric juice and saliva, while such distractions check secretion.

It is recommended to deal with such cases by letting the child become really hungry before a meal, decreasing the volume and caloric value of his food, and abstaining from using force.

A child may become irritable by being over-petted and by the parents taking no firm stand with him, thus neglecting the timely establishment of inhibitory processes which are particularly weak in young children.

Over-protected and over-petted children frequently exhibit high nervous tension. They demand to be carried in arms, bounced, rocked, and in general require constant attention and satisfaction of all their whims. They completely forget how to play alone.

When they are refused what they want such children fall into an affective state, screaming incontrollably, throwing things about, raining blows on the mother's face, throwing themselves backward from a sitting position or flinging themselves down on the floor, yelling and kicking. During some nervous attacks the child yells, then turns blue and stops breathing. Such conditions are termed as "affective convulsions", or occasionally as "infantile convulsions" or "screaming fits". These fits are always associated with excitation and never occur when the child is in a calm state, or during sleep.

Overstimulation of the nervous system and defective inhibition processes are conducive to neuroses in subsequent years, too.

Forced development of mentality and speech is particularly bad for children. Mental development is accelerated by an abundance of toys and books, by early memorisation of verses, by hearing too many stories, by verbose answers to questions.

Such mental acceleration is mostly encountered between the ages of 2 and 4 years, when children ask many questions about all the new things they see. In addition to the irritability and other nervous reactions observed in younger children, excessive motor activity may develop at this age, associated with restlessness and occasionally with obsessive gestures, bladder incontinence, or a particularly severe neurotic symptom—stuttering.

It is a popular belief that stuttering or stammering is caused by sudden fright. However, doctors are positive that stuttering is induced chiefly by overstrain of the cerebral cortex and collision in the part of the cortex Pavlov termed the "second signal system", the part that controls speech. Sudden fright or any other cause that precedes the stuttering is only a stimulus to the neurosis becoming manifest.

It is mostly in intellectual families that children are highstrung owing to precocious mental development, particularly when the child is an only one growing up among several grown-ups.

The following is an illustrative example taken from polyclinical records.

The mother, grandmother, and grandfather of Andrei N., 2 years 9 months old, presented themselves at the polyclinical department of the Leningrad Pediatric Institute complaining that their little boy had started stuttering several days ago without any visible cause, and two days later stopped talking completely. On the subsequent days the boy slept and ate badly, and cried a great deal.

This nervous disorder had not been preceded by any illness or deterioration of living conditions, there was likewise no cause for fright.

The boy was an only child in a cultured, well-provided family of six grown-up people. All the adults loved the boy, and every one of them did his best, as opportunities arose, to develop him. No particular tension was noted in the boy, but the whole family held him to be mentally advanced far beyond his age. The grandmother repeatedly stressed his precocious mental powers, calling him an "infant prodigy"; she even stated that she thought that the boy might perhaps excel his father and grandfather in the future and become President of the Academy of Sciences.

The history of the case gave the present author grounds for surmising that the child was being forced to premature development by his relatives.

However, this provoked loud protests; the grandmother insisted that it was not they who were developing the boy, but that he was in need of a special approach. She illustrated this point by saying that she had been compelled to get herself a book on astronomy, as she had forgotten a lot about the stars and was afraid of being put to shame by her grandson, who had acquired sufficient knowledge on the subject from his grandfather. Further it appeared that the boy owned a library of 300 books for children and so many toys that it had become difficult to buy anything new suitable to his age in the Leningrad stores, and therefore, the family was already buying toys designed for an older age group.

The child's father was very busy with his work, frequently coming home late in the evening. He was very insistent that the boy should not be put to bed before his return, that is, before 9-10 o'clock at night. Consequently, the child was going to bed at a very late hour. On his free days the father "engaged himself with his son", frequently driving the child around town in his car to acquaint him with places of interest in Leningrad.

This example may seem exaggerated, but it truly reflects the results of overstimulation produced by forced premature mental development; frequently overstimulation first accelerates development, and then brings on a collision of cortical processes and the formation of psychoneurotic disorders that may be very protracted.

Parents often permit their pre-school youngsters to stop going to sleep in the daytime, or let the child take his nap too late—at 2 or 3 o'clock in the afternoon, thus putting off the bedtime hour at night. Long waking spells overstimulate the brain cortex and by evening the children fret and cry; they usually have trouble in falling asleep, and sleep restlessly, often crying out suddenly at night.

Sometimes children may stop napping in the daytime because their schedule is not being followed; this leads to a disturbance of the conditioned sleep reflex that is so easily established in children.

Children of all ages need plenty of sleep, as sleep protects the cortical cells of the brain against excessive stimulation. Children of pre-school age still need their daytime nap, and even school children need it if they get tired easily.

Younger children, as well as schoolchildren, are overstimulated by being taken to the films or children's theatres too frequently, by having the radio going all the time, by excessive reading, particularly at bedtime, and by daily TV programmes. The association of a winking tic, obsessive gestures, nightmares, night incontinence, and occasionally stuttering with immoderate occupation with the above entertainments may be clearly established.

An antipedagogical practice frequently observed in families of low cultural standards is frightening, teasing, and deceiving children. Such things foster fearfulness, timidity, uncertainty, anxiety, and the children may develop mistrust of their elders.

It is bad for a child to be deprived of the society of other children and to be around grown-ups all the time, as this develops apishness, a too vivid imagination, and undue solemness.

Children who are not imbued at home with a timely realisation of social ethics and are not taught to consider other people's feelings and interests often grow up into egoists who have no respect for other people and their rights. Frequently such children, particularly those with the intense type of nervous activity, turn into family tyrants, and become a cause of much trouble and anxiety to their parents. In adolescence it is not uncommon for them to become deceitful, forward, exceedingly touchy, and for their behaviour to be antisocial. They usually do not get along with other children.

Bad examples set by others, particularly heated arguments between parents or relatives and their rudeness and open dislike of each other, have an unfavourable effect on children. They are particularly affected by parental inebriation which often creates intolerable conditions for the children and precipitates them into severe neurotic conditions.

Disagreement among parents and other relatives on rearing the child has an extremely harmful effect on him. Such disagreement frequently produces demands that run counter to each other, and finally the child does not obey his parents at all, or only obeys the orders he likes. Neurotic conditions are not unusual in such cases.

The following observation is a good illustration: the grandmother of Sasha M., a nine-year-old boy, came to the polyclinic of the Pediatric Institute for advice. Her grandson had been suffering for more than a year from bladder and bowel incontinence, both night and day, and showing bad discipline at home and extremely poor concentration at school.

By questioning the grandmother it was elicited that the father had died suddenly when the boy was only two. The boy lived with his mother; his paternal grandmother came over every day to take care of him while his mother was at work. Both women were well-educated, pleasant people, both loved the child warmly, but their ideas on his upbringing ran absolutely counter to each other. Owing to this they were in constant conflict and a feeling of dislike had sprung up between them. They often argued heatedly in front of the child, and, moreover, frequently said disagreeable things about each other in his presence.

The boy often found himself in a quandary, receiving two opposing instructions simultaneously. For instance, the mother would tell him to go outdoors, the grandmother would forbid him to do so. Such seeming "trifles" were numerous.

The abnormalities in the family led to a derangement in the activity of the child's brain cortex, manifested by extreme excitation and disturbance of inhibition. The "sentry posts" in the cortex were obliterated, so that the cortex no longer controlled the lower functions of the body.

Long talks with the mother and grandmother, revelation of the sources of the child's neurotic condition, and a basic change in the mutual relations between these two people helped normalise the boy's home life, and his trouble was overcome after prolonged treatment.

Neurotic disorders are common among adolescent children when families break up. The child becomes bitter, feels hurt, internal conflicts arise, particularly if he is greatly attached to the absent parent or if the new conditions of life do not satisfy his needs.

Extremely grave neuroses are observed when the parent who has departed from the home ceases showing concern for the child, or if conditions at home become depressive.

Here is an example. Shura S., a girl of eleven, was admitted to the neurological clinic of the Pediatric Institute; three months previously she had developed daytime bowel incontinence, had recently become very withdrawn from her mother and friends, and very unwilling to attend school.

Prior to this trouble the little girl had been bright at school and well-behaved, outgoing, and affectionate with her parents. She was particularly attached to her father, and the attachment was returned.

Several months before the morbid symptoms appeared her parents had begun quarrelling, and four months before admittance to the hospital the father had left the family. He was very regular in sending money, but he never once visited the children, although he lived in the same city and even passed their house every day in his car. The mother did not hide her bitter feelings and anger against the father from the children. Shura stopped going out to play as it upset her when the children pointed out her father driving past the house.

Evidently, the wrong attitude taken by the father and the extremely depressive domestic atmosphere had brought on a severe neurosis in the child.

The child's condition was discussed with her parents and explained to them; as a result they changed many aspects of their behaviour to the child. After a long course of treatment at the clinic Shura was cured of her neurosis.

Jealousy may also be a cause of neuroses. This can happen in children of any age. Young children often resent the parents' attitude to new babies, older ones resent the relationship between their own parent and a new stepmother or stepfather.

One such observation made at the polyclinic of the Institute may be cited in this connection. A girl of two and a half was brought to the polyclinic; the mother wanted advice on an abrupt change in the child's behaviour coincident with her return from the hospital with a new baby. The little girl had become irritable, noisy and unruly, had lost her appetite and slept badly, cried at night and showed her dislike of the newborn baby. She often repeated that "little brother is bad", that he should be "thrown away", and sometimes pinched him.

She frequently asked to be taken up into her mother's arms when the latter picked up the baby.

This type of reaction is mostly encountered in only children when their parents do not prepare them for the arrival of a new baby ahead of time. The condition may be intensified by a change toward the older child, when he is scolded a lot, told that he is "bad" and the baby is "good", and is punished frequently. It is recommended to prepare the older child for the arrival of a second child some time before the event, to arouse kindly feelings for the baby in him, to let him share in caring for the little one, and to give him frequent assurance of love and praise him for his good behaviour.

Severe neurotic disorders in older children are often precipitated by an erratic attitude toward the child on the part of a stepparent, or even on the part of the remaining real parent. Adults are quite frequently convinced that the neurotic reactions of children are just symptoms of the child being badly brought up and spoiled, and accordingly take sharp counter-measures. As a result the child becomes estranged and no reconciliation is possible.

To cite an example we present the case of E., a 12-year-old girl who was brought by her mother to the polyclinic of the Pediatric Institute. The mother complained of the extreme irritability of the girl, her restless sleep, deterioration of school work, rudeness to mother and stepfather, strange conduct: for instance, she had cut into shreds a length of cloth for a dress given her as a present by her stepfather, and had given away to a girl-friend her new slippers, although she liked both things very much herself.

Interrogation of the mother revealed that she had been a widow, and had remarried the previous year. The circumstances of the family (both as regards money and living conditions) improved, but the child had immediately taken a dislike to her stepfather, evidently out of jealousy. The stepfather did not recognise the underlying cause of her changed behaviour, taking her attitude to be the result of extremely bad upbringing; he was very strict with her from the very beginning, speaking to her only to order her to do something, and the mother had also became very strict.

In cases such as this a good talk with the doctor can do a lot toward reconciling the child to the new family conditions; a tactful approach of the stepfather and the mother and their joint efforts towards overcoming the estrangement of the child are also important.

Continuous rebukes and nagging may and do lead to intensification of the processes of inhibition in children.

When this occurs the parents complain of their children being either extremely slow, or of displaying violent reactions, depending on the nervous type of the child.

The following is an example: Tolya S., a boy of seven, visited the polyclinic; the mother complained of the boy's extreme dawdling. It took him an hour to put his clothes on, he ate very slowly, lagged behind the other children in all he did in nursery school.

A salient feature in the attitude of the mother to the child, as observed in the polyclinic, was the constant stream of admonitions she addressed to him. During the twenty minutes they spent in the consulting room she said: "stand up straight", then "look at the doctor", directly after that "take your hand out of your pocket", "hurry up and answer", "what are you thinking of?", "don't lean against the table", "don't crush your handkerchief", "hurry up and wipe your nose", "put your handkerchief into your pocket", "button up your jacket", etc.

Children are often restrained in everything at home, and are not permitted to do what is perfectly permissible. Quite frequently the demands on the mobility of cortical processes are exceeded by hurrying the child in all his actions: " get up faster", "wash faster", "hurry up and get dressed", "eat faster", etc.

Such constant curbing or excessive hustling either intensifies the inhibitory processes, causing the child to become a dawdler, or a collision of the inhibitory processes occurs and he reacts most violently to the slightest remark.

Parents who are themselves neurotic have an especially harmful effect on their children. Nervous parents, or other relatives, who deal with the child, are often unrestrained, irritable, unreasonable and inconsistent in their demands, thus their conduct toward the child is frequently very uneven: at one time they demand unequivocal submission in all trifling matters, at another pay no attention to flagrant misbehaviour. Nervous people often shout at children, beat them, do not respect the child's rights; this frequently precipitates a collision of nervous processes (a state of affection) when the child no longer heeds words and even beatings are of no avail.

Young children who are thus mismanaged start doing just the opposite of what they are bidden to do, for "spite", while in teenagers this condition develops into moroseness and rudeness and they may even become estranged from their parents or develop a dislike for them.

It is frequently feasible to alter the harmful atmosphere of the home and to improve relationships and upbringing. Occasionally, however, this is not possible; in such cases the best thing to do is to place the child in some child-care or educational establishment—a nursery (crèche), nursery school, or boarding school. If the school is a good one it usually has a very favourable effect on neurotic children. However, a neurosis may develop even in these establishments when the place is constantly too noisy, when the children are deprived of their naps at a too early age, when their nerves are overstrained by too many activities, or when the teachers permit themselves to shout at the children, are too strict, order them around too much, and forbid things too frequently.

School usually has a favourable effect on the child's nervous system, rationalising his life and imbuing him with a sense of duty. However, school may also be a cause of nervous tension.

Thus it is not uncommon for children who have started school at an earlier age than their classmates not to cope with school requirements when they get to the senior grades.

A bad thing for the child's nerves is the excessive demand of his parents that he should be at the top of his class, and their displeasure with lower marks. Children often acquire a too high opinion of themselves, and then even a good, but not excellent mark at school becomes a source of acute distress. When such high demands are put on children with average abilities, i.e., when they are required to put out more than they are able to, they exert themselves too much, frequently sit too long doing their homework at the expense of recreation, fresh air and sleep, and thus become overtense. All this combined with wounded pride and constant censure at home frequently brings on a severe neurosis of the neurasthenic type.

It is most fatiguing for children who attend the second shift at school to do their lessons after classes, as they are already tired out by the end of the day and cannot assimilate their homework properly.

It is likewise not good for children who go to school in the morning to do their lessons immediately after school. They should first have their dinner, take a walk, rest a while; this will restore their capacity for work.

The nervous system is not uncommonly overstimulated by additional lessons in foreign languages, music, drawing, dancing, particularly when the child himself has no particular bent for the subject, or no desire, or when conditions are unfavourable, or the lessons encrouch on rest, outdoor play, and sleep.

The above may be illustrated by one of our polyclinic case histories. Ten-year-old Petya N. came to the polyclinic with his father; the latter complained that the boy had become unruly, cried easily, was sleepy by day and restless by night, was lazy in his school work, and had lost all interest in his violin and piano lessons. The boy attended a special music school, and lived at home; he was evidently too overworked. His day began at 8 a.m. and ended at 11 p.m.; on alternate days he travelled very far, by two streetcars, to the home of relatives to practice on the piano for two hours, as the family had no instrument of its own, then he did his homework and went to school where the children first had ordinary school lessons, and then lessons in music; in the evenings he did part of his homework for next day. On the following day he played the violin for two hours, and then the routine was the same as on the preceding day. The child had absolutely no time for rest or play; his only outdoor activities were the car ride on alternate days, and he did not get enough sleep.

Many such examples might be cited. Nervous activity is frequently impaired by the disrupture of normal childhood that may occur owing to additional lessons, numerous duties, and little time for play and sleep.

Of course, this does not mean that children should not be taught music, languages, and other things, but it does mean that the child's schedule should be planned very carefully and that his physical condition should be closely observed and no overstrain be permitted to occur.

Sports and physical exercises in moderation are health-promoting pursuits, but on no account must the child be permitted to exceed his strength.

Feasible manual tasks at home and at school have an undeniably favourable effect on children, as they train the nervous system and are a protection against unilateral development.

In our discussions of the causes of neurotic disorders we dwelt briefly on some symptoms of neuroses in children.

The symptoms most frequently encountered are those of neurasthenic forms of neuroses, less frequently—of a hysteric neurosis, and still rarer of a psychasthenic neurosis.

In older children neurasthenia is manifested by fatigability, irritability, readiness to cry upon the slightest provocation, lack of appetite, bad sleep, headache and, less commonly, by fears and uncertainty.

In children of the younger school and pre-school ages neurasthenic neuroses are mostly displayed by such symptoms as stuttering, obsessive gestures or movements medically termed as "tics", nightmares, and bowel and bladder incontinence by night and by day.

It must be stressed that bedwetting is by far not always due to a neurosis. Often it may only be the result of the child not having been bladder-trained in time, so that no reflex sentinel post has been set up in the brain cortex.

The hysterical type of neurosis is less common in children. It occurs prevalently in schoolchildren whose upbringing has been faulty. Children affected by this type of neurosis are usually exceedingly unbalanced in behaviour, easily amenable to suggestion and autosuggestion, and frequently very self-centred. They are often of an artistic temperament, showing abilities for music, dancing, or drawing.

In this form of neurotic disorder the patients complain of symptoms of diseases they are not affected with: paralysis of the extremities, impossibility to stand or walk while retaining full locomotion of the extremities, unbalanced gait, loss of sensibility, blindness, deafness, muteness, headache. Occasionally they may have attacks somewhat resembling epileptic fits, and sometimes extraneous movements, resembling chorea, appear. These neurotic disorders are usually associated with unsatisfactory domestic conditions, and their action may frequently be latent. Neuropathologists usually diagnose such conditions in children quite rapidly, and the abnormalities are quite soon overcome by proper approach and treatment. Much thought needs to be put into the upbringing of children of this type, and a number of causes conducive to the development of their neurotic condition have to be removed.

Psychasthenia is a rare neurosis encountered only in teenagers. The children withdraw from reality and acquire an extreme tendency for reasoning. Loss of confidence in themselves is not unusual among such children, and even the development of various fears. Timely diagnosis of the condition and proper management usually bring the children back to normal. When neglected this type of neurosis may lead to a severe and protracted psychasthenia at a more advanced age.

The above brief exposition of the causes leading to the formation of neuroses in childhood also outlines the ways and means for avoiding them.

A correct and coordinated approach to the child in the family, with concern for individual traits, absence of nervous strain, reasonable demands aimed at gradually training the nervous system, and timely development of inhibition, as well as good examples set by adults—that is, a healthy, industrious family—are the prerequisites for bringing up children properly.

At home the daily schedule should be followed strictly in order to avoid overstrain; care must be taken that the children get enough sleep, and their general health must be under constant control.

When the child's life cannot be properly organised at home the best solution of the problem is some child-care establishment (a crèche, nursery school, or boarding school).

A neuropathologist should be consulted promptly upon the appearance of any signs of neurotic disorder, and all his instructions should be carried out to the letter.

DIATHESES

(Metabolic Disorders)

Your child seems to be in a state of nervous excitation, his sleep has become restless, he has developed some kind of itching red nodules on his skin, but at the same time his appetite and temperature remain normal, and in general his behaviour does not differ from that of children in normal health.

Your doctor will tell you that this is a metabolic disorder called diathesis. A large baby may weigh as much at four months as he should at six, but easily develop diaper rash even when very well cared for and his stool may be unstable: on one and the same day he may have a normal yellow movement, and then a movement containing a lot of green and mucus.

"A metabolic disorder—diathesis," says the doctor.

Just what is diathesis? Is it a disease? No, it isn't. Is it a healthy condition? No, it is not full health, either. It appears that there exist conditions on the boundary of health and illness. Such a border-line condition is diathesis.

Soviet medical terminology defines diathesis as an unusual reaction to an ordinary stimulant. The latter may be a food, an odour, a bacterial toxin, a drug, or even some indeterminable substance. However, this is only one aspect of the problem, the external cause. Now, only some, but not all, children get nettle-rash after having strawberries, not all children develop a rash when they eat eggs. Consequently, there also exists an inner cause, some attribute of the body itself that conditions its susceptibility to unusual reactions. This inner cause depends on the constitutions of some children.

The term constitution is understood as the total individuality of a person, including his physiological and anatomical features, part of which are inherited, part acquired, but which are revealed only by certain environmental influences. For instance, when a mother nurses her baby on the breast his allergy to cow's milk will, naturally, not be apparent, and only when he is transferred to artificial food will diathetic symptoms appear.

The conception of diathesis has changed with the progressive development of medical science. As our knowledge improved a number of diathetic conditions were identified as true diseases; to date only three types of diathesis have retained their significance. They are exudative-catarrhal diathesis, lymphatico-hypoplastic diathesis. and neuro-arthritic diathesis. The first type is the most widespread among children. It derives its name from the Latin *exsudare*, to perspire, and the Greek *katarrhoos*, a running down; the condition is that of increased irritability and sensitivity of the skin and mucous membranes to all manner of irritants, and their property of reacting with inflammatory symptoms to mechanical, chemical and other influences that are normal occurrences in the lives of ordinary children (friction of areas of skin against each other, contamination of the skin with urine, feces, and sweat, irritation of the intestinal mucosa by food or its chemical constituents, etc).

It is not even always possible to determine the cause of the diaper rash or the mucosal inflammation. Moreover, besides the visible mucous membranes, the mucosa lining the respiratory and alimentary tracts may likewise be involved.

In exudative-catarrhal diathesis skin eruptions are the symptoms most widely described, for self-evident reasons. These eruptions are very diversified and may be expressed in various degrees. The earliest manifestation is the ease with which diaper rash (or intertrigo in general) and "seborrhea sicca", or dry seborrhea of the scalp, appear; in lay terms the latter is frequently called "birth dirt". It appears in dry greyish crusts, part of which are of a darker colour. The crusts are formed predominantly on the top of the head and spread forward to the hairline. The removal of a crust reveals a pink surface which soon crusts over again.

Another symptom found in diathesis is the eruption of firm, red, itching papules the size of a split pea. These papules appear mostly on the extremities.

By the time diathetic babies are 2-3 months old they develop a redness and dryness of the skin on their cheeks that is always accompanied by itching, and sometimes by scaling; in the latter case the cheeks are like a grater to the touch; this condition is called milk scab. In some children a condition termed geographic tongue is observed (localised thickening of the epithelium and alternating strips of normal mucosa and coarsened epithelium give the tongue the appearance of a map). This condition of the tongue may persist until the child is 6 or 7 years old, and sometimes even longer, without causing him any trouble.

As the child grows he comes into contact with an ever-increasing number of things capable of being irritants. As his diet expands food irritants become more important. Cow's milk plays no insignificant part in the life of exudative children when it is used as a complemental food or as a constituent of the solids the baby receives. Let us recall that complementary foods are the formulas or cow's milk that the baby is given in addition to breast milk when its supply is insufficient. Solids are foods alien to the child that are introduced at the age when breast milk alone is not enough to cover the needs of the growing body.

When babies are nursed on cow's milk (or formulas containing cow's milk) the above-mentioned manifestations of diathesis may appear, as well as skin conditions resembling nettle-rash, and inflammations of the eyelids. Besides cow's milk, such conditions may be precipitated by the ingestion of eggs, certain fruit juices, chocolate, cocoa, and other substances. It is impossible to enumerate all the possible foods, among which even the milk of some women may be included; therefore the doctor needs the parents' aid in ascertaining the foods which cause exacerbation or formation of skin eruptions. It must, however, be remembered that not all children, but only some, react to these products; on the other hand, these foods are important constituents in children's nutrition, therefore parents should never deprive their children of milk, or egg yolk, or fruit juices without consulting the doctor, on the basis of "book dangers" alone.

The skin conditions due to exudative diathesis may have unpleasant complications: the itching itself may be troublesome to the child, impair his sleep and appetite, and the resultant scratches may become infected and lead to the development of eczema.

We have as yet only spoken of the outer or visible symptoms of exudative diathesis. However, no less important, albeit not noticeable to the eye, are general disorders associated with this condition. "General" or systemic disturbances are to some extent connected with the fact that the mucous membranes of the visceral organs are also capable of the same reactions as the visible mucosa (localised swelling, inflammatory conditions, desquamation). On the other hand, a distinguishing feature of a diathetic child is his faculty of retaining water in his body. The water is loosely bound in the subcutaneous tissues and is easily eliminated when the child's temperature goes up, or in cases of diarrhea. As a rule a child suffering from exudative diathesis looks quite chubby, and this easily deceives parents, making them think it is a sign of health. But such chubbiness does not gladden the medical eye, as pediatricians are aware of its delusive nature, and, moreover, know its cause.

Excessive stoutness is an impediment for the child, as it interferes with his activities, causing him to become sluggish, and lose interest in his toys: he may lie for a long time on his back without even attempting to move, and lag behind normal children of his age in development.

Most probably the disturbance of metabolic processes in the body leads to a decrease in the child's resistance: such children catch colds more easily, and their illnesses are more severe. A number of diseases (pneumonia, dysentery) tend to take protracted courses in children with exudative diathesis, sometimes even becoming chronic.

Although exudative diathesis is manifested most violently in children younger than two years of age, symptoms of it may also appear at an older age. When examining children of the pre-school and school ages doctors frequently come across complaints of nettle-rash, frequent sore throat, bronchitis, gastric and intestinal spasms, bronchial (allergic) asthma; these conditions are again based on the constitutional susceptibility manifested in early childhood by frequent diaper rash, milk scab, etc.

The so-called neuro-arthritic diathesis is a condition observed less frequently, and at a later age. Its symptoms are most flagrant at the pre-school and school ages, although certain signs may be defined in infancy. The distinguishing features of this type of diathesis are a peculiar condition of the nervous system and metabolic disturbances similar to those occurring in adults afflicted with gout.

Children so afflicted are seldom stout; quite the contrary, they are almost invariably skinny, sometimes even emaciated. The parents constantly complain of their child's lack of appetite. Indeed, the quantity of food ingested is very small, but this does not prevent the child from being extremely active. Such children do not sleep much, and their sleep is troubled by twitching and sudden outcries. Nettle-rash is not uncommon, as well as an occasional tendency for causeless jumps of fever. At the same time, arthritic children reveal exceptional mental development: they learn to speak correctly very early, have a good memory, are inclined to primitive logical reasoning, are attracted to the society of older children or even of adults. But these children are also very sensitive and irritable, they have fits of temper and easily turn from laughter to tears. In the pre-school and school ages new symptoms of the diathesis appear in the form of sick headaches (migraine), nervous fears, acute perspiration, and sometimes unconquerable vomiting, due to no visible cause, lasting for from several hours to several days. Occasionally these children are colicky, and experience frequent spasmodic pains in the abdomen which have no association with food. It is not uncommon for the stools of colicky children to have the appearance of small, round masses—sheep-dung stools.

There is no need to dwell separately on the lymphatico-hypoplastic type of diathesis, as it is very closely related to exudative-catarrhal diathesis, differing from the latter in the involvement of the lymphatics in the reaction to the irritant (in addition to the skin and the mucous membranes). Many children who are subject to "lymphatism" in early childhood are subsequently frequently affected by upper respiratory catarrhs, adenoids, chronic tonsillitis, and a number of other nose and throat diseases.

Our definition of diathesis as a constitutional condition that displays itself depending on environmental factors predetermines the leading part of prevention rather than treatment of this condition. Indeed, if we succeed in disclosing and removing the causes leading to the appearance of symptoms of diathesis the condition will remain latent. However, it is a deplorable fact that in the majority of cases it is impossible to define the precise provocative, and treatment is restricted to general measures alone, diet being first and foremost among them. In cases of exudative-catarrhal diathesis the diet is compiled with the aid of the doctor; it should exclude the constituents that precipitate diathetic symptoms. The first suspects are always cow's or goat's milk, curds (cottage cheese), eggs, chocolate, cocoa, salt, cereals, tangerines. The diet should be as variegated as possible and should contain a sufficient amount of vegetables and vitamins. It is advisable to substitute vegetable oil for part of the butter the child is given, beginning with his second year of life. Parents are particularly warned against overfeeding, since children with exudative-catarrhal diathesis are often good eaters. However, the child must not go hungry. A compromise between these two seemingly opposite requirements may be attained by giving him low-calory food in quantities sufficient to satiate him. When a child shows absolute intolerance for some type of food the latter should be completely eliminated from his diet. The greatest difficulties are encountered when a child cannot tolerate cow's milk or dairy products. In such cases a satisfactory substitute is some form of vegetable milk (soybean, almond).

In the neuro-arthritic form of diathesis the use of meat, meat soup, chocolate, cocoa, and beans should be very limited. The prevailing foods in the dietary should be vegetables and dishes with a high vitamin content. Mineral waters have a good effect on digestion.

The most important thing in exudative-catarrhal diathesis is scrupulous cleanliness in handling the child, although psychomotor development must not be neglected. But in neuro-arthritic diathesis the essential point is psychomotor development and physical training. As these children tend to precocious development parents should try to restrain them by restricting their reading and giving them only a limited number of books suitable to their age; no moving pictures, theatre, or TV should be permitted; the children should be isolated as much as possible from adult society and should mingle with other children of their own age. Daily schedules must be planned carefully, so that school work is not too fatiguing and the child gets enough time for sleep, outdoor activities and sports.

Whatever the form of diathesis the child's stamina should be built up as recommended in this book. Particular care is needed in inurement of children who tend to display symptoms of neuro-arthritic diathesis; all body-hardening measures must be applied under medical control.

Treatment for diathetic symptoms is prescribed by the doctor.

RICKETS

Little Tanya's mother came home from the child's health centre upset and hurt.

Just imagine! She went to the centre with her healthy baby, and "suddenly" the doctor told her that Tanya had rickets. Rickets—why, that's quite an offensive word, it sounds awful!

A neighbour comforted the young mother: "Nothing of the sort. Children with rickets have protruding bellies, big heads and crooked legs, while your Tanya is a fine, healthy little girl."

Who was right? The young mother was bewildered.

Let us help her get things straightened out.

What is rickets? What are the symptoms of this disease?

The first signs of rickets may appear at a very early age, when the child is only 2-3 months old; the back of the head perspires profusely, the baby tosses its head from side to side, a moist spot with rubbed-off hair remains on the pillow, and the back of the baby's head becomes bald. Fretfulness, frequent crying, and poor sleep are sometimes early symptoms of rickets.

Ordinarily these symptoms do not alert the mother, and she is surprised when the doctor tells her that her baby is developing rickets.

Softening of the skull-bones, the appearance of slight thickenings on the ribs—"beads"—and on the ends of the long bones of the arms and legs—"bracelets"—may likewise pass unnoticed. But when the head gets bigger owing to the formation of tubercles on the forehead and the top of the head (frontal and sincipital tubercles), when the baby is late in cutting his teeth, and when he shows a general lag behind other babies of his age in development, then the mother also realises that her little one has rickets.

Rickets is diagnosed quite early if the child is brought to the health centre regularly for examination; early diagnosis facilitates treatment and prevents the development of severe forms.

What is the cause of this disease?

Although rickets has been known for a long time, the discovery of its cause is a relatively recent event. Insufficient exposure to sunlight and a vitamin D deficiency in the food are the basic, but not the full, cause of rickets.

Bad care and management of the child are conducive to the development of rickets. Try to visualise the following picture: a baby, wrapped up in a blanket and wearing a warm cap, lies in his crib on a featherbed and a pillow of down. His crib stands by the stove, as far as possible from the window, and is screened ("so the light doesn't fall in his eyes"). The window is curtained, and flower-pots with tall plants stand on the window-sill. The baby is taken outdoors very seldom as the parents are afraid of his catching cold, and when they do take him out they cover his face "to protect it against the wind". Moreover, if this baby's nutrition is also mismanaged and he is given too much cereal and too little vegetables and juices—well, then we may be confident that all conditions have been created for this baby to get rickets. And yet his parents love him and think that they are taking good care of him and protecting him against disease.

And so the cause of rickets is clear.

What happens in the child's body when it is deficient in vitamin D?

The child grows very rapidly in his first year of life; the growing bones need mineral salts. In the absence of vitamin D the salts are not assimilated from the intestine into the blood, and they are not deposited, as they should be, in the bones, but are evacuated from the body. A sharp odour from the baby's wet diapers should alert the mother. Such an acute odour occurs when phosphates are abundantly passed in the urine at the height of rickets. The bones, becoming deficient in salts, thin out and soften, therefore the baby's legs and arms bend, and in severe cases of rickets fractures may even occur. Instead of having smooth bones and a trim little head the baby develops thickenings in the form of "bracelets", "beads", and "knobs".

However, not only the bones suffer.

Metabolic processes are impaired. The brain, too, needs mineral salts, as do the muscles and the proper functioning of all the internal organs. This is why rachitic children are usually flabby, apathetic, fretful, cry frequently, and may remain for long spells in one and the same attitude.

The child's development is inhibited: he holds up his head later than other children do, sits up later, walks later.

The muscles of such children are limp and flabby. Their abdomens sag and are frequently distended; the bowel function may be disturbed, diarrhea alternating with constipation.

Children born in the winter, as well as premature infants, twins, and bottle-fed babies are particularly susceptible to rickets.

In these children rickets, when left to itself, takes a severe course, and is conducive to other diseases, particularly pneumonia. Neglected forms of rickets result in deformed spines, flat feet, a flat pelvic girdle. The latter is particularly deplorable in girls, as a flat pelvis impedes normal childbirth.

How are rickets to be avoided?

The prevention of rickets should be thought of before the baby is born—there are nine months for that. This means that the future baby must get vitamin D, sunlight, and a sufficient amount of mineral salts through his mother's body.

Consequently, prospective mothers must spend more time outdoors, must eat more raw vegetables, fruits, and berries. If the doctor prescribes fish-liver oil and vitamin D they must be taken.

What foods contain vitamin D?

Vitamin D is soluble in fats and occurs in the livers of fish and marine animals, in caviar (fish roe) and in eggs. Fish-liver oil is a natural product with a high vitamin D content; currently it is artificially enriched with this vitamin. The labels on the vials containing fish-liver oil usually state the amount of vitamin D units per gram of the oil. Vitamin D is usually measured in conventional international units (IU). For instance, one drop of an alcoholic solution contains 4,000-5,000 IU of vitamin D (the oil solution contains approximately $2^1/_2$ times less). A pregnant woman needs 500-800 IU daily, and 1,500-3,000 IU in the last 2-3 months before delivery. This is approximately one drop a week and one drop every other day in the last 2-3 months (the oil solution is correspondingly increased $2^1/_2$ times). So we see that a pregnant woman needs very small amounts of vitamin D to prevent the appearance of rickets in her unborn child. Naturally, the doctor should be consulted in every individual case.

Breast milk (as well as cow's milk) contains almost no vitamin D at all. But if the nursing mother takes fish-liver oil or vitamin D her milk will be enriched with this vitamin. Of course, this is so only on condition that she is out in the fresh air enough, sleeps enough and eats normally.

We shall now discuss the prevention of rickets in children after birth.

If you want to avoid rickets in your baby follow all the doctors'advice about feeding and schedules; herein lies the principle of rickets prophylaxis. The vitamin D drops will only be effective if your baby is fed properly, if he is taken outdoors enough, and is active in his waking hours. Although the vitamin and mineral salt values of breast milk are low, even this little is very valuable for the child. Breast milk is an irreplaceable food for babies. Children nursed at the breast do not develop severe forms of rickets. Timely addition of solids—cereals (at 5-6 months), vegetable purèe (at 6-7 months), juices (at 2-3 months)—are also important measures for avoiding rickets.

We have already dwelt on the importance of outdoor airings for babies; be sure not to cover the baby's face, even if it is a very small infant, let the sun rays, reflected from the blue sky ("sky shine"), fall on him; these rays are also protection against rickets. But direct sunlight may be harmful for babies in their first year of life. The best thing is to walk with the baby in some shady place, under the trees, leaving his face open, and when he gets bigger his arms and legs, too. Every hour in the open air is protection against rickets.

Suitable clothing, activity and physical exercises are also antirachitic factors.

The other forms of prophylaxis (vitamin D, ultraviolet irradiation by mercury vapour and sunlight lamps, and fish-liver oil) are prescribed by the doctor. Vitamin D is given in drops. The number of drops per day and the duration of the course are determined by the doctor for each individual case.

It is important for mothers to be aware of the following: the bottle containing the vitamin preparation must be kept in a dark, cool place, and the preparation must be given regularly. The prescribed number of drops are added to a teaspoonful of tea or water. When the alcoholic preparation of vitamin D is added to tea the latter turns cloudy. This is quite as it should be. Remember, once you have started the vitamin D course do not miss a single day, and visit the doctor again a month later. He will compute the amount of vitamin D received by the child and will either cancel the prescription or alter the dosage.

Irregular administration of vitamin D is harmful. Neither must any day be missed, nor the number of drops increased without the doctor's permission.

Fish-liver oil should also be kept in a dark and cool place. It is advisable to buy small bottles, containing 50 to 100 g. Doses are prescribed by the doctor. The fish-liver oil should always be cold and clear. Before giving it to the child do not warm up the whole bottle, but pour the needed amount into a hot spoon and then give it to the child when it is warm. If fish-liver oil causes frequent bowel movements, or if the child develops an aversion for it stop giving it and consult your doctor.

Irradiation by artificial ultraviolet rays has a very beneficial effect; it is prescribed by the doctor and administered in the physiotherapy departments of the local children's polyclinics.

There is no need to be afraid of taking the child out into the street after he has been exposed to ultraviolet rays; he will not catch cold. Ultraviolet irradiation is not a thermal (heat) procedure, and the child does not get warmed up, as the mother may think. The main thing is not to miss any of the treatments and to complete the full course.

Occasionally the doctor prescribes a solution of calcium chloride simultaneously with the vitamin D or ultraviolet irradiation. This is a bitterish-salty colourless liquid that contains calcium, an element necessary for strengthening the bones.

And what if the child does become victim to rickets?

The methods of treatment are the same—vitamin D and ultraviolet irradiation. Fish-liver oil alone and observance of feeding rules and daily schedules are not enough for curing rickets. The number of vitamin D drops is increased by the doctor; regular ingestion of this vitamin may arrest the development of rickets even though it has already started.

And now let us return to little Tanya's mother.

If she gives her baby the vitamin D prescribed by the doctor, and gives it regularly, if she feeds her little girl correctly and keeps her out in the open air for many hours her baby will not develop any severe form of rickets and will grow up normally.

LACK OF APPETITE

One of the most frequent complaints mothers make to doctors is that their child has lost his appetite. The mother's anxiety over her child's poor appetite is well-founded, as every mother knows that a healthy appetite is a sign of the child's health. Lack of appetite is associated with many illnesses of childhood, but then there are also other signs which the mother usually notices. If the cause is some illness the doctor will diagnose it and prescribe treatment, and the child's appetite will improve as his health improves. However, feeding problems mostly arise in perfectly healthy children as the result of mismanagement of nutrition, feeding, and care.

To understand the causes leading to loss of appetite one must understand the nature of appetite itself. To date it has been proved by the experiments of Ivan Pavlov and his followers that digestion is regulated by the nervous system. There is in the child's brain, as in the adult's brain, a food centre the condition of which determines whether the individual feels hungry or full. When the food centre is in an excited state the person feels hungry. When the food centre is in a state of repression, or inhibition, the desire for food—the appetite—deteriorates or disappears. Both excitation and inhibition of the food centre are associated with changes in the constituents of the blood flowing in this area of the brain. Depletion of the blood of nutritive substances ("fasting blood") stimulates the digestive centre; this stimulation or excitation is transmitted to the salivary glands and the glands secreting gastric juices, and also to the corresponding muscles. As a result the digestive glands secrete their juice, infants nurse eagerly, while older babies try to snatch their bottles or plates of food, and eat their food heartily. After a meal the food centre passes into a state of inhibition; this is due to the changes that occur in the blood ("satiated blood") and also to the fullness of the stomach; the latter sends signals that cause inhibition in the food centre. Inhibition of the food centre results in a decrease of secretory activity in the digestive glands and a reduction of the excitability of the masticatory and other muscles. If the child is offered food at this time he will refuse it.

The entire process of digestion is governed by intricate reflex activity both in adults and in children. Just what does the term reflex signify? A reflex is the reaction or response of the body to some external stimulus (or irritant), enacted by means of the nervous system. Thus, for instance, the taste of food stimulates the nerve endings in the mucous membrane of the tongue; from these nerve endings the stimulus is transmitted by the corresponding nerves to the brain, where a definite excitation of the food centre occurs; from the food centre a signal is passed along other nerves to the salivary glands, and the latter produce saliva. This reflex is inborn, or unconditioned (natural, instinctive). The newborn infant possesses a number of unconditioned reflexes. Thus, he sucks when put on the breast, sneezes when his nasal mucosa is irritated, etc.

However, soon after birth a whole series of acquired, or conditioned, reflexes are formed on the basis of the inborn reflexes. Thus, approximately by the second or third week of life the child develops a reflex to the postural attitude he is placed in when nursed. In this case sucking commences as soon as the infant is placed in this position, even before he is offered the breast. By the end of the first and beginning of the second month of life the optical sucking reflex appears; the infant makes sucking movements with his lips at sight of his mother's breast.

Later a conditioned feeding time reflex appears. It has been proved by animal experiments that when animals are fed at definite hours a reflex to the feeding time is gradually formed. At these fixed hours the animals secrete digestive juices even when no food is offered. Analogous reflexes are formed in children at a very early age when a definite feeding schedule is followed.

It is easy to see from the above how important it is to feed children at definite times over strictly definite intervals differing in children of different ages. In the first month of life infants are usually given 7 feedings in 24 hours, every 3 hours with a six-hour break at night for uninterrupted sleep. From the end of the first and beginning of the second months of life and approximately up to the time the baby is 4 or 5 months old six daily feedings are given over $3^1/_2$ hour intervals, with a night break of $6^1/_2$ hours. From 4-5 months to $1^1/_2$ years of age children are fed 5 times a day, every four hours, with an 8-hour interval at night. Children older than $1^1/_2$ years usually have four meals a day.

When definite feeding hours are not observed and the baby has his food irregularly he is often not hungry at any time. Mothers very frequently seem to be following a feeding schedule, but give their children pieces of pie, buns, or cookies at the first sign of wanting to eat between meals; this extinguishes the excitation of the food centre that has just begun, and as a result the child is not hungry, he has no appetite by the next fixed mealtime.

A particularly harmful effect on appetite is produced by sugar and various sweets when given to children before or between meals. The studies of Professor N. Krasnogorsky have proved beyond doubt that sugar and various sweetstuffs decrease the conditioned reflex activity of the digestive tract and metabolic processes, thus producing an acute deterioration of appetite. To ensure a healthy appetite the child must never be given any sweets before or between meals; candy, cookies, sugar, sweet tea and so forth must be greatly restricted, and given only as a dessert after a meal.

The studies of Ivan Pavlov and his followers have shown that the secretion of saliva and gastric juice begins long before the food is taken into the mouth or delivered to the stomach. Secretion is induced by the mere sight or odour of food, or by preparations for a meal. This first portion of digestive juice secreted in the so-called conditioned reflex phase was termed "priming juice" by Pavlov, as it starts off the digestive cycle. Pavlov also pointed out that there was no manner of irritant that could compare either qualitatively or quantitatively with the urgent desire for food in stimulating gastric secretion. He also emphasised that the most wholesome food was that which was eaten with a healthy appetite, while food given forcefully was much inferior as its assimilation was much less intensive.

An important point in serving the meals of older children is setting the table. An attractively set table and the entire preparation for the meal stimulate the activity of the digestive glands and whet the child's appetite.

Normal appetite depends to a great extent on a properly managed daily schedule. Children must play outdoors, sleep, and eat at fixed hours. It is absolutely necessary for the child to be out in the open air for some time every day, independent of weather. Children who do not get much time in the fresh air are commonly poor eaters.

Frequently children, particularly younger ones, drink milk readily but completely refuse to take any other food. Milk is indeed an absolutely necessary and at the same time easily assimilated food, but only in certain quantities. Milk alone cannot provide for the needs of the growing body; in the second year of life the child cannot do without vegetables, cereals, meat, fruits. A monotonous milk diet leads to anemia and to loss of weight.

It is not uncommon for parents who know of the importance of vitamins to strive to give their children a large amount of vitamin-containing food such as oranges, tangerines, and other fruits, often at the expense of some dish that the child has refused to eat. This is a harmful delusion. Vitamins contained in various raw fruits and vegetables do play an important part in metabolic processes, but these vitamins by themselves cannot satisfy the requirements for the basic body-building nutrients—proteins, fats, and carbohydrates. Therefore the unlimited ingestion of vitamin-containing juices or fruits is no replacement for milk, meat, eggs, and other foods. Vitaminised juices and fruits are necessary items of the child's diet, but they should be given only as dessert after a regular meal.

Children must not be overfed, neither must they be given too much high-calory food or fats in excess. It is known that fat, when there is too much of it, inhibits gastric juice secretion, disturbs protein digestion, and thus finally impairs the appetite.

Poor appetite may be connected with a decreased function of the salivary glands. In such cases children are seen to keep their food in the mouth for a long time, not being able to swallow it. These children should be taught to take their food in very small amounts at a time. A good idea is to give them a little water to drink during the meal; the moistened food will be easier to swallow.

Healthy breast-fed infants are normally always eager to suck. Loss of appetite usually coincides with the addition of solids. It is not uncommon for this loss of appetite to be associated with compulsory feeding. Sometimes the mother prepares a wholesome, tasty dish for her child, but the latter refuses to eat it, as is the case when the child is satiated and his food centre is in the phase of inhibition. An over-anxious mother is apt to try to get her child to eat by some kind of trick, threat, or even by stuffing him by force. And this is just where the root of the evil lies.

A child should never be forced to eat when he is not hungry. Compulsory feeding leads to the development of a negative reaction to food. This negative reaction may appear not only at the sight of food, but may be associated with the entire environment in which preparations for the meal take place, or with the definite person who always feeds the child. The child shuts his mouth tightly, pushes away his plate, shakes his head, spits out his food, and so on. Insistence on eating may lead to vomiting.

This negative reaction to food is associated in the majority of cases with compulsory feeding at a time when the child is not hungry at all; in such contingencies sites of excitation are formed in the child's brain that inhibit the functions of the food centre. Compulsory feeding frequently leads to the gradual formation of a conditioned negative reflex in the child.

Besides the unconditioned food reflexes children are born with they also possess quite a number of other inborn reflexes. Among these reflexes is the so-called defense or protective reflex. Young children are frequently afraid of new toys, domestic pets, strange faces, and turn away, pressing themselves against their mothers when they encounter such objects. And just such a strange object is every new dish introduced into the child's diet. A negative reaction to feeding is concomitant with non-secretion of saliva and gastric juice, as excitation of the protective reflex centre inhibits the activity of the food centre. If the parents, notwithstanding the child's definitely negative reaction to certain foods, persist in feeding him by force the frequently repeated negative reflex will become more and more fixed. It will take no longer than a few days for this negative reflex to include not only the offered food, but also all the surroundings associated with eating. Thus, the mere fastening of the child's bib, settling him at the table, the clatter of spoons and dishes may provoke this negative reflex. The child cries, refuses his food, and often the meal terminates with vomiting. A mother should know all this, and introduce every new dish very gradually to let the child get used to it. When a child persistently refuses some food that is necessary for him to have it may be given to him as an addition to some other food that he is fond of.

Parents striving to get their child to eat willy-nilly frequently resort to various stratagems to distract the child and thus weaken his resistance to taking food. They try to amuse him with stories, by singing, dancing, and so on. The child's attention is distracted, and for a certain time the protective reflex is weakened and the child listlessly swallows the offered food. However, neither does he feel the taste of the food nor enjoy it, and none of the priming digestive juice is secreted; the digestion and assimilation of food taken in this manner is much inferior to that of food eaten with a healthy appetite.

Severe cases of poor appetite make the parents nervous, and this in its turn leads to gross infringements of the feeding and general regimens. Over-anxious mothers frequently overfeed their children out of fear that they may not get enough, and often use force. The child's meals are invested with nervous tension and fuss, and this is by no means conducive to improvement of the appetite. Parents should know that the appetites of children, just as of adults, are subject to ups and downs, and that there is no need to worry if the child eats less than usual during a meal. Never coerce him into taking more by persuasion or force. Remember that food taken actively is much more wholesome than food taken under compulsion. The food a child has eaten with a good appetite is digested and assimilated much better owing to a more intensive secretion of the digestive juices.

Another appetite impairing factor may be irregular bowel evacuation. When this is the case the tongue is coated with a white film, and the sense of taste deteriorates. It is then necessary to do something for eliminating the constipation.

During various acute illnesses the child's appetite is usually reduced. The infection toxins and other toxic substances have an inhibitory effect on the vital activity of the body as a whole, and also on the excitability of the food centre, leading to a decrease of digestive juice secretion. Sick children do not want to eat, during convalescence their appetite gradually returns. Occasionally return of appetite lags behind recovery and subsidence of temperature. Parents, however, must not be too hasty; they must not try to coerce the child into eating when he does not feel like it, as this may lead to the establishment of a negative reaction to food, and as a result a child who was a good eater before his illness may turn into a very poor eater upon recovery.

To avoid feeding problems parents should always follow the definite set of feeding rules that are the logical conclusion of the above exposition.

First of all a child should be good and hungry by his mealtime; he will be hungry only if no less than 3-4 hours have passed since his previous meal, and only then will a positive reaction to food arise.

Children should always be fed at fixed hours; this gradually establishes a conditioned reflex conducive to the secretion of the digestive juices in anticipation of the meal, and owing to this secretion the food is digested more intensively in the child's stomach.

The child should not be given various sweets—candies, cookies, buns, and the like—between meals (while taking a walk, for instance), as they decrease the excitability of the food centre in the brain, blunt the feeling of hunger, impair the appetite.

The child should be fed in an attractive environment. This also stimulates normal digestion. The table should be of a height that is convenient for the child. His own small dishware should carry some bright picture. The child's bib or apron must always be clean and look pretty to him, and it must never smell of oilcloth. The child should sit (or be held when very young) in a comfortable position during his meal.

Each new food is added to the diet (at the time when solids are first introduced) very gradually and patiently. Before the baby is put to the breast he is given first a taste and then several teaspoonfuls of the new food for several days; the amount is gradually increased, and the meal is rounded off by breast-feeding. Subsequently the breast feeding is gradually replaced by the new food.

When a child refuses his food he should not be induced or forced to eat it. Take the food away in a most matter-of-fact manner and give it to him at his next regular meal. This time he will usually readily eat what he refused several hours ago. Naturally, the child's tastes should receive some consideration, and the dishes he prefers should be given more frequently than the ones he likes less.

One should never try to induce a lazy eater to eat by telling him stories or promising things for eating this or that food. This is a positively antipedagogical practice, besides being unhealthy from the medical point of view. Just explain, in a kind tone of voice, that when one doesn't want to eat it is better not to, and take away the food, serving it at the next meal. This calls for a certain degree of fortitude on the mother's side, but she should not be afraid that her child will die of emaciation if she does not compel him to swallow his food. When healthy children are no longer fed by force, and all the above-mentioned rules are observed their appetites become quite normal within a few days.

During meals the child's attention must be centred on his food. Anything that distracts the child during meals (conversation of adults, the wireless or TV, domestic animals or toys) should be eliminated.

Parents should remember that nutrition is only part of the general health-schedule of the child upon which his development, disposition, and appetite depend.

Frequently children who are poor eaters at home start eating quite readily when they are entered in a nursery, nursery school, or similar establishment. This is due to the change of environment, to the absence of the customary irritants that provoked the negative attitude to food. Moreover, in these child-care institutions the children follow a certain general schedule which plays an important part in normalising digestion. In these establishments there is usually none of the compulsory feeding which has such a bad effect on the entire process of digestion. As a result children who attend child-care establishments do not ordinarily display any lack of appetite. In some instances it may be advisable to place children with poor appetites in a child-care establishment for at least some time.

As the child becomes older his appetite usually becomes normal. In some children this occurs only after they start school, and is probably connected with change of environment and greater independence.

However, one should not just sit back and wait until the child's appetite improves spontaneously. All measures should be taken to ensure a healthy appetite at all meals. Prolonged undernourishment and erratic dietaries may result in inhibition of weight gains and growth, in backward development, in susceptibility to various diseases and greater severity of their courses. Particularly persistent aversion to food calls for medical advice, as occasionally loss of appetite may be the result of certain latent chronic diseases.

GASTROINTESTINAL DISORDERS

Gastric and intestinal trouble in children, particularly very young ones, are a source of great anxiety to young mothers. Sometimes they are frightened by relatively harmless disorders, but sometimes a disease that rapidly becomes severe in children may be overlooked and neglected. It is important for mothers to know what digestive trouble she may encounter, its source, and what she can do before the doctor can be reached.

In the first month of life the baby's abdomen may become distended, he may have difficulty in passing gas. *The infant cries shrilly, twists his body, bends his knees to his belly*, and a new mother just home from the maternity hospital may think that her baby is seriously ill.

In the immediate future the baby will learn how to expel the gas through the rectum by straining his abdominal muscles, and this cause of crying will disappear. But how is he to be helped when the flatulence is not relieved spontaneously? Place the baby, face downward, on your palm, supporting his head. The hand creates warmth and a support for the abdominal muscles, thus facilitating the passage of the gas. A hot water bag containing a little warm water may be placed on the child's stomach. Light massage of the abdomen (the staff at the health centre will teach the mother how to do this) may also help. Some babies are relieved by the insertion of a rubber tube into the anus. However, this should be done only at the doctor's advice, as the baby may get used to the tube and never learn to eject gas by himself. If the baby suffers from frequent abdominal distension and voids gas and stools with difficulty the doctor must be consulted. Occasionally the cause may be some disease or some inborn deformity of the intestine.

Mothers are frequently troubled by their babies spitting up (regurgitation). The mother should be able to differentiate spitting from vomiting. Spitting commonly occurs directly after a feeding, less frequently it may be delayed 2-3 hours. The volume of spit-up milk differs—it may be quite considerable, or very sparse. The spit-up milk may be either curdled or unchanged, but in distinction from vomiting it never contains any yellow clots, mucus, flakes, nor is its odour pungent. The odour of spit-up milk is weakly acid and flat. The general condition of the child is unaffected by spitting, he remains peaceful, happy, and sometimes even goes on sucking the breast. After vomiting the child usually becomes pale and listless, refuses food. Vomiting is projectile, the vomitus is noisily ejected to some distance, while regurgitation is unnoticeable, the milk just trickles down the child's neck.

Vomiting, particularly if it is attended by fretfulness, flatulence, diarrhea or constipation, requires prompt medical attention. A disease accompanied by vomiting may call for urgent medical aid.

The spitting-up of small amounts of milk in the first two months of life is an almost normal occurrence; it passes by the time the baby is 3 or 4 months old and calls for no treatment.

However, overfeeding may be responsible for spitting-up. Constant overfeeding is a harmful load on the digestive glands and it may bring on diarrhea.

The amount of milk obtained from the breast by the baby may be checked in the health centre by weighing the child before and after feeding him.

If the doctor finds that the baby is overeating he usually advises the mother to nurse him for a shorter time, and to put him on a different schedule (less feedings).

Another quite innocent and easily corrected cause of regurgitation is swallowing air while sucking. This is particularly noticeable when babies are rapid and avid suckers and the mother produces enough milk.

If the baby is placed in his crib, face up, immediately after he has been fed the air bubble will press and trouble him, and finally it will be ejected through the mouth, bringing up a great deal of milk with it. If the air bubble passes into the intestines it will also distress the child by distending the intestinal loops. Complaints of spitting-up, intestinal rumbling, and frequent passage of gas are commonly made about babies who swallow air while nursing.

The remedy for this trouble is a very simple one. The baby should not be put into his crib directly after he has been fed. He should be uprighted cautiously, his head and back supported by the left hand, and the buttocks by the right, and thus propped against the mother's shoulder. The bubble will come up with a popping noise, and with it a little milk will be brought up (put a diaper on your shoulder). Now the baby may be put into his crib, there will be no abundant spitting-up or fretfulness.

It is very important to check the weight gains of children who spit up frequently. Low weight gains should alert both the mother and the doctor. The child may have to be hospitalised in order to determine the cause of the regurgitation. Particular care is needed when the spitting begins at the age of 3-4 weeks and the infant ceases gaining weight, micturates less, and becomes constipated. Timely medical advice and hospital treatment will cure him.

Hiccups

Some babies hiccup quite frequently for no visible reason at all. The hiccups do not seem to disturb the child, he may only spit up a little. But if the child is not troubled his mother is. For some reason or other a mother thinks that her baby is hiccuping because he is cold. However, she can assure herself that his feet are warm. Therefore, cold is not the cause.

A deplorable, although frequent, practice of some frightened mothers is to pick up the baby, rock him in their arms, give him something to drink; however, the hiccups do not disappear immediately anyhow. It must be made clear that there is no need of treating hiccups, they will pass spontaneously if the child is left alone. Naturally, all feeding rules should be observed. If the child develops normally and is healthy and contented there is no need to be afraid of hiccup spells; they will cease spontaneously.

Constipation

Mothers frequently complain of constipation in their children, or, rather, of infrequent stools.

The retention of the stool for one or two days in breast-fed babies who are gaining well in weight is not dangerous. It is due to an intensive absorption of breast milk and the absence of waste products or roughage that stimulate intestinal activity. The condition is corrected by giving the baby a few drops of sugar syrup, fruit juice, or a bit of grated apple. And, as with flatulence and non-passage of gas, relief is also obtained by massage and physical exercises as well as by placing the baby on his stomach on some hard surface (the playpen, a board) for some time between meals.

However, the mother must not try to combat constipation on her own without consulting the doctor, as sometimes constipation may be the result of an inborn deformity of the intestinal tract, and a very thorough medical examination is then needed. It is particularly important not to miss such an abnormality when the baby's weight gains are low. Another cause of constipation is hunger (undernourishment).

It is harmful to purge the baby's bowel frequently with enemas, as the latter irritate the anus, impede the formation of a reflex for independent defecation, and, what is most important, make it possible to overlook a serious disorder. Mothers should bear all this in mind. In all instances of persistent constipation the doctor's advice is necessary.

Diarrhea

In the first month of life infants usually have from one to three or four bowel movements every day, and only one or two in the subsequent months. The movements of one- or two-month-old babies are not necessarily yellow; they may often be curdy and greenish, and be passed frequently. Subsequently the stools change, becoming yellow, thicker, and less frequent. The disposition of the baby and his weight curve are very important. If the movements are greenish and curdy after the mother brings her newborn baby home, but the baby sucks eagerly, sleeps well and gains sufficiently in weight, she need not worry or attempt any treatment. However, she must be certain the baby is not overfed or underfed and that he is gaining well in weight. This is done by checking how much milk the baby obtains and by weighing him no less than once a week.

If a baby has more than four bowel movements a day, and the movements are loose, doctors say that the child has diarrhea or dyspepsia. The word "dyspepsia" means "undigested", "uncooked". Undigested food irritates the mucous membranes of the stomach and intestines and leads to diarrhea.

Diarrhea occurs frequently in children. Are all forms of diarrhea the same? No, they are not. The causes of diarrhea differ. In infancy diarrhea is not uncommonly caused by erratic nutrition. For instance, the mother, instead of feeding the baby at fixed hours nurses him frequently, at any time of the day and even at night. Diarrhea is particularly dangerous for fat bottle-fed babies with metabolic disorders (exudative diathesis). Not only is food harmful when given in excess, it may also harm the child when it is of an unsuitable quality. And even suitable food, when it is new and the transition to it is too rapid, may cause diarrhea.

A great many germs cause digestive disorders in children.

Food that is not stored properly and is kept too long is a good medium for many germs. This is particularly true of sweetened milk, sweetened curds (cottage cheese), creamed puddings, meat and fish products, and canned foods.

Bacteria such as the colon bacillus and the Shiga bacillus (the pathogen of dysentery) are frequent causes of diarrhea in children.

Finally, pneumonia, ear trouble, and other diseases are frequently attended by diarrhea in babies.

What causes this disorder?

From birth until he is 4-6 months old the baby produces digestive juices capable of digesting only breast milk. Cow's milk is too coarse a food for young babies. The latter are likewise incapable of digesting other foods that are the normal fare of adults.

The non-pathogenic bacteria that commonly inhabit the lower portion of the intestine work their way upward when conditions become unfavourable (such conditions may be created by overheating the body or by inflammatory processes in some organ that is not even connected with the stomach).

The contents of the baby's stomach are very mildly acid (as compared with adults), not acid enough to kill off the bacteria. Thus the latter are enabled to multiply, causing fermentation and decay which lead to intensification of the contractile activity of the intestinal walls and diarrhea. The bacteria multiply and perish, and the products of their decomposition are taken up by the blood, thus poisoning the entire system.

When the cause of the diarrhea is not too harmful, the bacterial load not too great, while the infant is generally healthy, a condition of so-called simple dyspepsia develops. The bowel movements take on the aspect of yellowish-green curdled lumps ("chopped eggs") with a slight greenish admixture, and are passed 4-5-6 times a day. No vomiting occurs, the baby's appetite is normal, his general well-being is not impaired. However, should the disorder be caused by a great number of very harmful germs, and should the infant be either too thin or too stout, or be recovering from some disease—then the trouble may develop into a very grave condition called toxic dyspepsia. The baby becomes listless, refuses to take food, vomits, his bowel movements become very frequent (10 and more times a day) and watery, bladder activity decreases; these are all very threatening symptoms that point to the gravity of the condition.

Dysentery

Dysentery may also be mild or severe.

The majority of parents think that dysentery is a diarrheal stool with blood in it. But by far not all of them are aware of the trickiness of dysentery in young children. There may be no blood in the stools, only mucus, and sometimes not even that; the only sign may be wateriness.

It is very difficult to differentiate dysentery from dyspepsia without doing special tests. And even such analysis of the feces (cultivation in special media) may prove to be negative in some cases of dysentery. The disorder can then be diagnosed only in a hospital.

Why is it so important to establish whether the diarrhea is caused by dysentery or not? Dysentery is a highly communicable disease that is dangerous for people who come into contact with the patient. The danger of dysentery for the child himself is not confined to the acute period alone as relapses and transition to a chronic condition leading to emaciation are possible.

We now know that the majority of gastrointestinal diseases (including simple and toxic dyspepsia) are caused by pathogenic intestinal bacilli and other germs. Consequently, not only dysentery, but all other types of diarrhea may be contagious.

How to Avoid Diarrhea in Children

All we have here said about diarrhea leads to two conclusions: (1) parents should be aware of the causes of diarrhea in children and be able to prevent it; (2) any case of diarrhea requires medical attention, and should never be treated with the help of neighbours or just by looking it up in a book.

Let us discuss more explicitly the measures necessary for the prevention of diarrhea in children. We shall have to return once more to the basic feeding principles set forth in the chapter on nutrition, which every mother should know by heart. Breast-feeding is the best means of avoiding diarrhea in the hot months of the year, particularly when infants have been or are ill. The rule that solids be introduced very gradually (and only such foods as the doctor advises) must be strictly observed.

Never give a child under two years of age any sausage, chocolate, or pastries!

If the doctor recommends kefir (milk acidified with kefir grains), clabbered milk (sourmilk) or cottage cheese (pressed curds) always buy these products for children under one year of age in the district dairy kitchen for babies.

Particular attention should be paid to storing foods in hot weather. Cottage cheese and cream will not keep, and if they cannot be refrigerated these foods must be given to the child directly after they are brought home from the dairy kitchen.

Milk should be boiled or pasteurised.

Breast milk obtained from a milk donor spoils very easily. It should be boiled, and not kept raw; the nursing bottles should be kept in the refrigerator, or in cold water which is changed frequently.

Before feeding the child warm up only just enough for his meal; if he does not finish this portion do not offer it to him at his next meal.

The hot months are particularly dangerous for infants. Mothers must remember how easily babies are overheated (overheating is also possible in the winter when the baby is wrapped up too warmly).

Heat increases the baby's thirst, but it may seem to the mother that he is hungry, and so instead of the water he needs she gives him milk, thus overfeeding him and upsetting his digestion.

The danger of flies as infection carriers is common knowledge. Flies must be driven from the baby's room. A mother may consider that she has put away all the food, but she often forgets to cover the baby's pacifier lying on the table—and a fly perched right on it—or his bottle of tea or water with its nipple. All nipples, pacifiers, and bottles should be boiled and put away out of the reach of flies. Nor should one forget to wash toys with soap, as babies often put them into their mouths.

One frequently notices in the street or in stores how careless mothers offer their children just bought grapes or apples. The fruits are unwashed, so are the child's hands. Just imagine how many germs he consumes with his apple! Fruits and vegetables should be washed thoroughly and rinsed off with boiled water before being given to the child.

An essential point in combating intestinal diseases is that the mother's hands must be clean when handling the baby. It should become a habit with mothers to wash their hands before diapering the baby and before preparing his food.

If somebody in the family or very close neighbourhood is suffering or recovering from diarrhea or some other intestinal disorder the child should be strictly isolated from this person, and a particularly intensive war should be waged on flies.

Upon the appearance of the first signs of diarrhea call the doctor and do not listen to anybody's advice, do not try to treat the child yourself. A baby's harmless intestinal disorder may very rapidly turn into a mortally dangerous toxic dyspepsia.

Before the doctor arrives the sick child should be placed in his crib, given no food, and offered frequent drinks of cooled boiled water or tea (from a spoon). Vomiting may be precipitated by too much fluid, therefore only 1 or 2 teaspoonfuls are given every 10 to 15 minutes. The room should be well-aired, the child divested of all extra clothing (do not put too many coverings over him). These are the correct first aid measures, pending the doctor's arrival.

If the doctor considers that the child is in need of hospitalisation he should be taken to the hospital immediately, for the first symptoms of the life-threatening toxic dyspepsia may escape the mother's notice and much grief may result from a belated hospitalisation.

If the child is permitted to remain at home all the doctor's prescriptions must be strictly observed. First of all, the room must be well-aired and the child should be given a sufficient amount of water or saline solutions prescribed by the doctor. Treatment must be consistent, and never be stopped halfways, even after the diarrhea has ceased it can easily appear again following the least deviation from the prescribed diet and medication.

Thorough disinfection is performed by mopping the floor and wiping the furniture with mops or cloths wrung out in an 0.5 per cent solution of chloramine (chlorazene) and soaking the diapers in 25 per cent chloramine; such disinfection is absolutely indispensable in the domestic treatment of diarrheal children.

In conclusion it will be well to point out some erroneous, but widespread conceptions.

Many mothers have heard (but never from a doctor) that fresh vegetables and fruits, when included in the dietary of the nursing mother, may lead to diarrhea in the baby.

Fear of diarrhea by such misinformed mothers results in the mother depriving herself, and, consequently, her baby, too, of many necessary vitamins and mineral salts. Several apples or tomatoes a day can never be a cause of diarrhea in mother or baby.

It goes without saying that any food taken immoderately may bring on digestive trouble.

A second erroneous conception is that diarrhea accompanies the cutting of the baby's teeth. Eruption of the teeth can only coincide with the diarrhea, but never cause it. Mothers, believing that diarrhea incidental with the cutting of a tooth needs no treatment, frequently neglect a disease. Always remember that the eruption of the teeth is a normal physiological process, while vomiting, diarrhea, and fever coinciding with this process mean that the baby is ill and needs urgent medical attention.

ACUTE RESPIRATORY DISEASES IN CHILDHOOD

Respiratory diseases are quite common among children. The anatomy of the respiratory organs in childhood is conducive to such diseases, as the nasal passages, larynx, trachea (voicebox and windpipe), and bronchi are narrow, the mucous membranes tend to swell up rapidly, the respiratory muscles are weak, etc.

Respiratory disorders are most frequent among flabby children whose nutrition has been mismanaged (particularly in cases of too much cereal and flour-containing foods), and also in rhachitic children.

Neglectful care of the child is also conducive to respiratory diseases (the child is not taken outdoors enough, the rooms are moist or overheated, unaired, the child is dressed or covered too heavily).

Other important factors are climate and seasons.

Acute respiratory diseases commonly occur in cold, moist weather (in the autumn or early spring), i.e., they depend on chilling.

Upper Respiratory Catarrhs

Catarrhal conditions of the upper respiratory passages are frequent childhood ailments. The condition is usually due to an infection with any of the various germs usually found on the mucous membranes of the respiratory passages. Resistance to these pathogens is weakened by chilling or other unfavourable circumstances whereupon the vital activity of the germs intensifies, and the result is a catarrhal state of the nose and throat.

Upper respiratory catarrhs are also symptoms of infectious diseases such as measles, grippe, influenza.

Upper respiratory catarrhs are usually accompanied by moderate fever (37.5-38°C), general indisposition, a cough, running nose, sneezing, watering of the eyes, mild headache. These conditions may be complicated by inflammation of the tonsils (tonsillitis); the child then develops a sore or scratchy throat and there may be enlargement and tenderness of the cervical and submaxillary lymph glands. Catarrhal conditions of the throat and windpipe are manifested by a coarse, barking cough and hoarseness.

Older children do not usually suffer much when affected by uncomplicated upper respiratory catarrhs and recovery takes place within 3 to 6 days.

In infants, however, a grave condition may develop. The baby may start spitting up, vomiting, diarrhea and sometimes even convulsions may develop. Swelling of the nasal mucosa obstructs breathing and is a hindrance to sucking.

Complications of upper respiratory catarrhs are earache, bronchitis, pneumonia (particularly in very young or feeble babies).

In rare cases, during the first years of life, upper respiratory catarrh may develop symptoms of false (spasmodic) croup—acute obstructive laryngitis.

The child suddenly (mostly at night) develops an attack of asphyxiation caused by the swelling of the voice box (the larynx) or of the tissues below or above it. This swelling narrows the air passages and makes it difficult for the child to draw air into his lungs, hence the noisy breathing so typical of croup. The attack usually subsides in 2 to 3 hours, but a doctor must see the child during the attack as it may be the beginning of a graver condition (for instance, diphtheritic croup).

A child sometimes has a running nose for a long time after a common cold (a form of upper respiratory catarrh); after some time the nasal discharge turns purulent, the child develops a moderate evening fever (37.2-37.5°C) and complains of a general let-down feeling and headache.

The above symptoms may be signs of sinusitis, inflammation of the nasal sinuses or pockets. A chronic cold in the head (rhinitis) and difficulty in breathing through the nose are also characteristic of enlargement of the adenoids behind the nose in the back of the throat.

Chronic diseases of the nose and throat (sinusitis, chronic tonsillitis, adenoidal enlargement) lower the child's work capacity, affect his nervous system and appetite, and are also conducive to the onset of certain grave diseases (pneumonia, bronchial [allergic] asthma, rheumatic fever, diseases of the heart, kidneys and other organs).

Acute Inflammation of the Middle Ear

Middle ear infections (or otitis media) are more frequent among children than among adults. The middle ear is the space containing the little bones which conduct sound waves to the inner ear; it is covered on the outside by the tympanic membrane or eardrum. In childhood the auditory (or Eustachian) tube connecting the throat with the tympanic cavity on each side is short and its lumen (the space inside the tube) is relatively wide, bacterial penetration easier. Ear infections are mostly complications of upper respiratory catarrhs, or of certain infectious diseases (scarlet fever, measles, influenza), although they may occur independently.

Older children suffering from acute inflammation of the middle ear complain of shooting or lancing earache. Babies and infants become extremely fretful, cry inconsolably, are very restless and toss their heads from side to side; when nursed they pull away from the breast with shrill cries after making several sucking motions; vomiting and diarrhea are not uncommon.

If the inflammation becomes suppurative the eardrum may break down, after which a purulent discharge appears from the ear.

Bronchitis

Bronchitis is inflammation of the linings of the bronchial tubes caused by bacteria or viruses. The lumens of the bronchial tubes become narrowed owing to the formation of mucus by the cells of the lining.

Besides fever and general indisposition the principal symptom of bronchitis is a cough, first dry and later moist and productive of a mucoid sputum. If a child is old enough he spits out the mucus brought up with his cough, or swallows it if he is too young. When a bronchitic child breathes hoarse rales are frequently heard even at some distance from him.

Pneumonia

Pneumonia is a more severe disease. It is particularly dangerous for infants. Pneumonia mostly affects weak children who have contracted an upper respiratory infection, or it may be the complication of some infectious disease (measles, whooping cough, influenza).

Besides functional changes in pulmonary respiration pneumonia, as a rule, also involves other organs and systems (the cardiovascular system, the nervous system).

The general condition of the child usually suffers during pneumonia; he becomes either very inert or very restless, loses his appetite, runs a high fever.

However, it must be pointed out that feeble, emaciated and premature infants may display no rise in temperature, notwithstanding the severity of their condition.

The child with pneumonia develops a frequent moist cough, he becomes very pale, even blue in some cases; his breathing is laboured, the nostrils are dilated. In severe cases respiration is accompanied by grunts or groans, occasionally the head nods in tact with the breathing.

Gastrointestinal symptoms are not uncommon developments of pneumonia; in infancy they are manifested by spitting up, vomiting, diarrhea, and meningismus—convulsions.

In children older than 5-6 years a specific form of the disease, lobar pneumonia, is observed—when a whole lobe of the lung or its greater part is involved.

Lobar pneumonia has a sudden onset, with high fever (39-40°C), the child looks very sick, complains of headache, vomits, has a hacking cough, shooting pain in a side; he sometimes complains of abdominal pains. The fever is high for several days and then drops suddenly (critically). During this rapid fall of the fever the child may become very listless, pale, and may even loose consciousness, but this crisis is generally a favourable and not a dangerous event, as it heralds recovery.

Caring for Children with Acute Respiratory Infections

When a child shows signs of an acute inflammation of the respiratory organs he should immediately be put to bed and the doctor promptly called. Only a doctor can diagnose the condition correctly, evaluate its severity, and select the best method of treatment. In severe cases, particularly when the patient is an infant, hospitalisation may be necessary. This, too, can only be decided by the doctor. A great part in the domestic treatment of the child (besides adequate medication) is played by proper management.

A child with an acute respiratory infection must first of all be isolated from the healthy children of the family. His bed should be placed in the lightest part of the room, as far as possible from any heating device. Cleaning should be done with moist cloths and mops, as dust irritates the mucous membranes and intensifies coughing. The room temperature should be within a range of 18-21 °C. An overheated room with excessively dry air is extremely harmful for a patient with an acute infection of the respiratory passages. In such cases (particularly in pneumonia) the child's general fretfulness increases, as do his cough and difficulty in breathing, and he sleeps restlessly.

A child with respiratory trouble must have a sufficient supply of fresh air. His room must be aired frequently; in winter the transom or part of the window should be opened for 10-15 minutes every $1^1/_2$ to 2 hours, in summer the entire window should be kept open. Fresh air is particularly important during pneumonia, since the child suffers from oxygen deficiency. Such patients are highly benefited by being carried out on a porch, or outdoors (depending on the weather).

The child may be taken out in his carriage or crib, or carried in arms.

The advisability of taking the patient outdoors must be judged by the child's doctor.

The upper part of the body of a child sick with pneumonia should be raised (on a pillow). Such a position makes breathing easier.

The patient must not be allowed to remain in one position for too long, he should be turned from side to side; infants should be picked up from time to time and held in the arms.

Spicy, salty, and fat foods should be eliminated from the diet of the patient at the height of an acute respiratory infection. The small volume of food that is given should be easily digested. Milk, kefir (or acidified milk), thin cereals, puréed vegetables, fruit juice starch puddings, stewed and fresh fruit, clear broth, fruit juices and sweetened lemon tea are recommended foods.

An infant whose breathing is laboured (dyspnea) cannot suck well, and therefore it is advisable to nurse him more frequently (after first consulting the doctor), or to feed him from a spoon.

It should be remembered that at the height of a disease the child's appetite is low, therefore he should not be fed by force, to avoid vomiting.

When the child is running a fever he needs more liquids than usually.

Older children affected with an upper respiratory infection attended by a high fever should be given sweat-inducing (sudorific) drinks, such as tea infused with raspberries (usually dried berries are used) or tea with honey. Warm mustard foot-baths are also good for acute colds.

Mustard paper (or plaster) and mustard packs are widely used in the treatment of bronchitis and pneumonia. For inflammation of the ear dry warmth and hot compresses are prescribed.

Spasmodic (false) croup is frequently alleviated by the inhalation of warm vapours, by hot compresses on the throat, and by mustard foot-baths.

The techniques of the above procedures, as well as other points in child care, are circumstantially described in the section on domestic care of the sick child.

All medicines (antipyretics, expectorants, antibiotics, sulfa drugs, and others) are administered to children only when the doctor prescribes them. Parents should complete the course of treatment prescribed by the doctor, and never restrict themselves to giving the child merely several doses of medicine to bring the fever down. Remember that inflammatory processes in the tonsils, bronchi, or lungs very frequently persist even after the fever has gone down.

Irregular, chaotic treatment develops a tendency to relapses or chronic processes.

Chronic nasal discharge and stuffed nose may be signs of sinusitis or adenoiditis. Such children must be examined by a specialist in diseases of the ear, throat and nose (an otorhinolaryngologist).

It is necessary to build up the resistance of children who have a tendency for frequent colds by various inuring procedures (physical exercises, ablutions, bathing, clothing appropriate to the season, outings in the fresh air, etc.).

Another important thing is how and where the child spends his summer. Dry, warm climates are recommended for children who are frequently subject to upper respiratory trouble. Steppeland and mountain climates are particularly salubrious in such cases.

Parents should consult the doctor before selecting a place to take their child to in the summer.

WORMS ENDANGER CHILDREN'S HEALTH

Parasitic worms (or helminths) that are the cause of morbidity in man are widely encountered throughout the world.

At present a vast number of various species of these parasites are known.

All helminths are divided into definite classes, depending on their specific properties. These classes include suctorial worms, flatworms, and roundworms.

The medical name for the worm diseases caused by parasitic worms and their larvae is helminthiasis (or helminthic diseases). The symptoms of the disease depend on the species of worm, the worm load, the location of the parasites in the body, and the individual reaction of the body. In the human body helminths provoke inflammatory processes in the organs they infest, while their toxic products have a poisonous effect on the system as a whole.

The clinical features of a worm disease depend basically on the above two factors.

Worm infestation is mostly observed among children of the pre-school and school ages, and is particularly harmful to them. Worms frequently impair the child's appetite, make him nauseous (especially in the morning), and he develops an aversion to certain dishes, chiefly fatty foods. In the majority of cases the child complains of abdominal pain, either constant or spasmodic. The stools may be unstable.

In severe cases of helminthiasis the nervous system may be involved; this is manifested by increased irritability, rapid fatigue, restless sleep, headache. Children infested with worms become absent-minded, pale, skinny, their growth is stunted. Sometimes their memory is impaired, making school work difficult, and formerly bright scholars become backward in their studies.

The routes of worm infestation are various. The predominant one is through swallowing the eggs or larvae of the worms. In other cases man acquires the disease by eating infested meat (beef or pork) and fish that has been only partially cooked.

Children are mostly infested with roundworms. The largest representative of the class of roundworms or nematodes is *Ascaris lumbricoides*, an ascarid worm widely encountered all over the globe.

Roundworms (Ascariasis)

Ascarids are large roundworms ranging from 15 to 40 cm in length. They habitate the small intestine where they deposit their eggs.

The eggs are voided from the human body with the bowel movement. Freshly voided ascarid eggs are not infestive.

In favourable conditions (in the soil) the eggs mature within 3 to 6 weeks, larvae developing in them.

When man swallows a ripe egg a larva emerges from it in the intestine; this larva works its way through the intestinal wall into the blood stream. The blood carries it to various organs, including the liver and lungs.

In the lungs the larvae again work through the walls of the blood vessel and penetrate into the bronchi. Coughing brings the larvae into the mouth, from whence they are again swallowed. After this second ingestion the larvae are delivered to the stomach, and then to the intestine where they develop into adult worms. It takes about three months from the time of infestation with the ascarid ova (eggs) until an adult ascarid worm is formed.

The body is not indifferent to the migrations of the larvae through it. The intestinal and bronchial walls are injured by the penetrating larvae and inflammatory sites are formed; this impairs the general condition of the child, and causes painful sensations.

The degree of mechanical injury inflicted on the intestinal wall depends on the worm load. When there is a great number of these worms they tend to coil up into a ball that can block the intestine, making the patient's condition quite severe.

Ascarids are detrimental to the child's health even when there are only a few of them. Even 2 or 3 roundworms may precipitate a severe worm disease. The ascarids live in the human intestine for approximately one year, and they frequently leave the body with no treatment at all. However, children should always be treated for roundworms if they prove to be infested by these helminths. The most authentic confirmation of the presence of ascarids in a patient is the recovery of the worms or their eggs from the bowel movements.

Eradication of the worms should be undertaken only on the doctor's advice and under his guidance.

Reliable deworming agents or vermifuges for ascarids are santonin (a constituent of wormseed), sancaphen, heptylresorcinol, piperazine, and some other drugs. In cases when all these drugs are contraindicated oxygen treatment is administered (the oxygen is piped into the stomach through a thin tube).

The second representative of the class of roundworms are pinworms (or threadworms). These worms are most common among children.

Pinworms (Enterobiasis)

Pinworms (also called seat worms or threadworms) look like tiny white threads about 1 cm long.

They live in the lower intestine, sometimes in great numbers—several hundred or even thousand may be present at a time. The female pinworms do not deposit their eggs in the human intestine but come out between the buttocks for oviposition.

Within 6-7 hours a larva develops in each egg, and the egg is then "ripe". The ovipositing females crawl about very actively, causing itching around the anus.

The females come out of the intestine at night when the host is at rest. The itching disturbs the child's sleep, and he contaminates his fingers with the pinworm eggs by scratching the anal region, and from the fingers the ova are conveyed into his mouth. Thus conditions for repeated self-infection are created. Moreover, the pinworm eggs contaminate the bedding, bedclothes, and floor. In dusty premises children easily become infected by inhaling and swallowing the pinworm eggs. Children infested with pinworms sleep restlessly, awaken frequently, fret a lot. Pinworms may cause vaginal irritation and inflammation in little girls by creeping into the vagina.

The pinworm lives in the human body for about one month. However, a child may suffer for years owing to self-infection when hygiene is faulty. Pinworm infestation is diagnosed by finding the eggs of the parasite in the feces or, still better, in a scraping taken from the anal region and from under the child's finger nails.

Control measures against pinworms are not easy. First of all strict observation of sanitary and hygiene rules is imperative. Children should be taught to wash their hands carefully before each meal and after bowel movements, and never to bite their nails. The perineal region should be washed every day with soap and warm water. Good effects are obtained by putting the infested child to bed at night in closed trunks (or tights) to avoid contamination of the bedding or hands with the eggs. In the morning the trunks are boiled or ironed with a hot iron, so that they are clean again in the evening. To alleviate the distress caused by the itching a purging enema may be given before bedtime to evacuate the pinworms that have accumulated in the lower part of the intestine.

The vermifuges used for controlling pinworm infestation are sulfur preparations, piperazine, gentian violet (synonyms: crystal violet, methyl violet, methylrosaniline chloride), and other agents. All the other members of the family must simultaneously be examined and, if necessary, treated for pinworms. Several cycles of treatment are administered over intervals of 7-10 days.

Another intestinal nematode worm common among children is the whipworm.

Whipworms (Trichuriasis)

The whipworm, *Trichocephalus*, ranges from 2 to 5 cm in length. Its anterior thread-like end serves for attaching the worm to the wall of the colon. The toxic substances whipworms produce have a harmful effect on the child's nervous system and blood.

The female whipworms, like the female roundworms, deposit their eggs in the human intestine. The egg requires something like one month in optimal conditions for maturing in the outer environment.

When man ingests mature eggs larvae hatch from them in the intestine; these larvae work themselves into the intestinal wall and there develop into young parasitic worms. It takes about one month from the ingestion of the eggs with the living larvae in them to the deposition of eggs by the new generation of adult females.

Ordinarily whipworm infestation produces no marked symptoms, but occasionally it is the cause of colicky pains in the navel region, of protracted diarrhea, nausea, vomiting and headache. In children anemia often develops. Trichuriasis (whipworm infestation) is confirmed by the demonstration of the eggs of the parasite in the stool (by microscopy).

Whipworm control in children is difficult to attain, and treatment is not always effective as the worm protects itself against the direct action of the vermifuge by boring its head into the depth of the intestinal wall.

The most effective drug is osarsol (synonyms: acetarsone, acetarsol).

Less effective are heptylresorcinol and thymol. Whipworm eradication necessitates hospitalisation of the child and strict medical supervision.

Hookworms (*Ancylostomiasis*)

Another representative of the nematode worms is the hookworm, *Ancylostoma*.

The hookworm is a little larger than the pinworm, its mouth is armed with two pairs of curved teeth (hooks) by means of which the worm attaches itself to the mucous membrane of the intestine. A child may be host to several thousand hookworms simultaneously. This bloodsucking parasite has a bad effect on the system as a whole owing to the mechanical injury it inflicts on the intestinal mucosa and to the specific substance it secretes; this substance prevents blood-clotting. Prolonged hookworm infestation leads to delayed mental and physical development of the child (stunted growth), and also to severe anemia.

The female hookworm deposits its eggs in the human bowel; these eggs are voided with the bowel movements in a stage of early segmentation. In the outer environment when there is sufficient moisture in the soil and the temperature is approximately 30°C infestive larvae are hatched from the eggs in five days.

Man acquires the infection by two routes: through the mouth and through the skin. The hookworm larvae penetrate into the bloodstream either through the intestinal wall or the intact skin, and their subsequent migration in the human body is the same as for roundworms.

Children infested with hookworms frequently complain of upper abdominal pain. Nausea, heartburn, vomiting, coated tongue, and loss of appetite are just as common. At early stages of the disease constipation is observed, and later constipation alternates with persistent diarrhea. When the infestation occurs through the skin local inflammation and swelling may occur at the site of penetration.

Deworming is done in hospital conditions. The agents used are thymol, chenopodium oil, carbon tetrachloride (tetrachloromethane), and tetrachloroethylene. After the worms have been eradicated the child requires general treatment for strengthening his body.

Tapeworms (Taeniasis)

Tapeworms are segmented, ribbon-like flatworms; they compose the second important group of worms parasitic to man.

A characteristic feature of all tapeworms is that man is not always their only host. Fish, cattle, hogs, and some other domestic animals may be intermediate, and in some cases even definite, hosts of these parasites.

The largest of the tapeworms is the beef tapeworm; it attains a length of from 4 to 10 metres in the human intestine. The worm consists of a head (the scolex) armed with four suckers, and numerous segments (proglottids).

The tapeworm attaches itself by means of its suckers to the intestinal wall and thus is not evacuated from the intestine. The posterior segments are large and full of fertilised eggs; they break off easily and are then either voided with the stool, or make their way out of the body independently. In the external environment the segments rupture and the eggs fall out. Cattle drinking contaminated water or grazing on contaminated pastures pick up the eggs; in their intestine larvae hatch from the eggs. The larvae are carried by the blood stream through the body of the cattle, settling in the muscles or liver. Here the larvae encyst, forming vesicles that are visible to the naked eye (the cysticercus stage). Man acquires the tapeworm infection by consuming insufficiently cooked meat that contains the living cysticerci.

Pork containing living cysticerci is the source of pork tapeworm infestation when it is not cooked properly.

The pork tapeworm is much more dangerous for man than the beef tapeworm, as not only the worm itself develops in the human intestine, but its larvae become encysted, forming cysticerci in the human muscles and organs, as they do in pigs. Consequently, one and the same patient may be affected simultaneously by a pork tapeworm in his bowel, and by cysticercosis. The latter may be due to self-infection, or to secondary infestation with the eggs of the parasite derived from other tapeworm hosts.

The largest of the tapeworms is the broad (or fish) tapeworm. It grows to 10 or 20 metres long. The larvae of this parasite in the form of tiny white worms are often found in the muscles and internal organs of many species of fish. When man consumes such fish raw or only partially cooked he acquires the infection. In the human intestine the larva develops into an adult worm. The latter lives in the intestine, attaching itself to the wall by suction. The eggs from ruptured segments fall into the intestinal canal, and are thus voided into the outer environment. In water the egg undergoes a number of transformations, and finally a larva emerges from it. The larvae are consumed by small shellfish—cyclops, and the latter, in their turn, are swallowed by fish in whose bodies the larvae may remain unaltered until they are swallowed by a human being, in whom they develop into an adult fish tapeworm. However, man is not the sole definite host of this parasite; it is also known to live in cats and in dogs.

All the above-listed tapeworms are dangerous parasites of man. They are particularly harmful to children in whom severe anemia develops much sooner than in adults. The children complain of dizziness, headache, nausea, abdominal pain and they lose weight. Diagnosis is established by the demonstration in the feces of separate segments (in cases of beef and pork tapeworms), or eggs (the fish tapeworm). The patient has to be hospitalised for deworming; the most common deworming agent is aspidium oleoresin, an ether extract of the male fern. Less efficient are pumpkin seeds and some other preparations.

Besides the long tapeworms children are frequently infested by the dwarf tapeworm. This is a species of flat tapeworms, measuring about 2-3 cm in length. They inhabit the small intestine of man. One child may be host to several thousand of these worms.

The dwarf tapeworm goes through all its developmental stages in the intestine, and the eggs voided with the bowel movements may be already ripe, i.e., capable of infesting. Therefore person-to-person infestation is quite possible, as well as self-infection.

Children who harbour these parasites complain of abdominal pain, vomiting, loss of appetite, and bowel trouble.

Diagnosis of dwarf tapeworm infestation is established by the examination of the feces for the eggs of the parasite. Deworming is also effected with aspidium oleoresin (male fern extract), but in three cycles given over 10-12-day intervals, since, considering the possibility of self-infection, the simultaneous presence in the bowel of parasites in various developmental stages is probable.

The shortest of the tapeworms is the dog tapeworm *Echinococcus*, also called the caseworm.

In man this tapeworm is found only in its larval stage. The definite host is the dog. Upon settling in the organs of man or of some animal the larvae of the dog tapeworm acquire the form of a one-chamber (less frequently a multi-chamber) cyst or case.

The favourite localisations of the caseworm are the liver, the bile ducts, lungs and abdominal cavity. The patient's symptoms depend on the localisation of the caseworm and the lesions it has caused in this area. The disease is usually of long duration, and suppuration of the echinococcus with a break-through of the pus into the surrounding tissues may occur.

In such cases the only possible treatment is by surgery. Death is inevitable if the patient is not operated.

Children are infested with caseworms more frequently than adults, as they come into closer contact with dogs, among whom the disease is widespread. Any worm disease is harmful for the health of man, and particularly in childhood. It is always more difficult to cure worm diseases than to prevent them.

The population at large should help the health service officials gain control of worm diseases. To be able to do so everybody must be aware of certain facts: (1) all worm-infested people require special treatment; otherwise they harm not only themselves, but also the people around them; (2) soil and water bodies should never be contaminated with non-disinfected night-soil, as the latter may contain worm eggs; (3) strict individual hygiene in the home and in handling food must be observed. Parents should always bear these points in mind.

General measures of prophylaxis against diseases include washing the hands with soap before meals and after visiting the toilet, wearing clean clothing, and sleeping on clean bedclothes. Raw vegetables and fruits must always be scalded with boiling water before eating. Uncertified meat should never be bought, nor should underdone meat or fish be consumed.

Worm infestation is mostly acquired in the summer and autumn, and the first symptoms of the disease usually appear in the winter. Consequently, this is the time when parents should be most attentive to the condition of their children. The child should be taken to the doctor immediately the slightest sign of worminess appears, as the result of treatment depends on its timely institution.

KIDNEY AND URINARY TRACT DISEASES AND THEIR PREVENTION IN CHILDREN

The view of kidney trouble as a particularly dangerous ailment is widespread, and, indeed, not without just cause, as medical science has found. The kidneys are organs of complex structure that enact extremely important bodily functions. Human life is impossible without these organs.

The kidneys are paired glandular organs situated on both sides of the spine in the lumbar region. They contain a stupendous number (about one million) of glomeruli—tufts of capillary loops. The kidney helps to regulate the normal concentrations of blood constituents by filtering the blood, excreting from it water and various waste substances. The glomeruli are responsible for the blood filtration and for the formation of urine; the latter accumulates in a special capsule and is then delivered through a system of tubules to the renal pelvis, undergoing a number of transformations on the way. From the pelvis the urine is conveyed through the ureters to the urinary bladder.

The formation of urine in the human body is continuous, but its excretion is periodic. The urine accumulates in the bladder, and when it becomes full enough for the urine to exert pressure on its walls it contracts and the urine is voided through the urethra (Fig. 9).

It is known that the body regulates the volume of urine excreted. Thus, in adults this volume of urine passed decreases with fluid intake deficiency, and the urine becomes more concentrated. The formation of urine in infants is characterised by certain features that must always be taken into consideration. The mechanisms that regulate urinary secretion are not fully developed in infants. The volume of urine they excrete does not change noticeably when they do not drink enough; as a result they lose water very rapidly and dehydration is possible. Therefore even very young infants must be given tea or boiled water, a thing that many mothers often neglect to do.

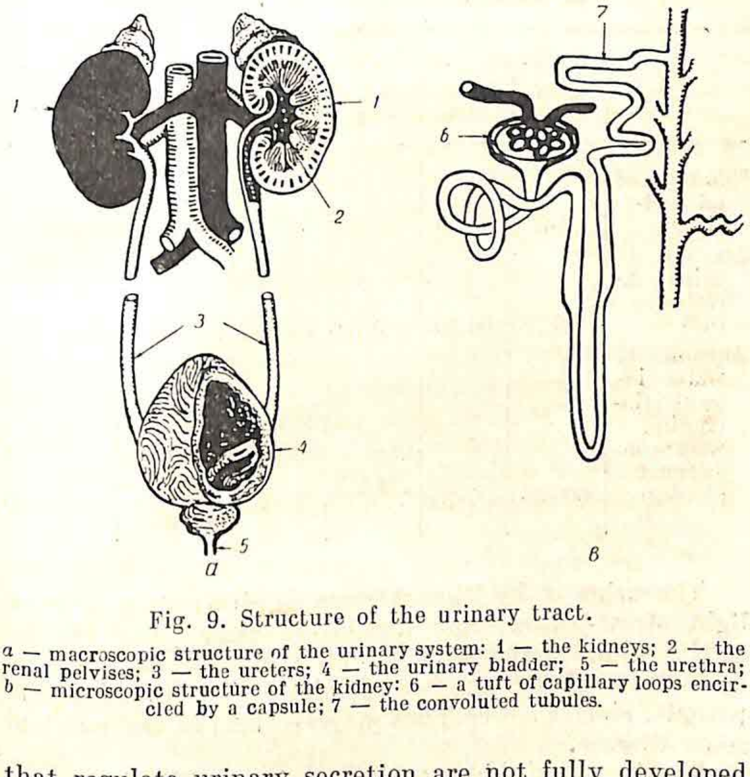

Fig. 9. Structure of the urinary tract.

a — macroscopic structure of the urinary system: 1 — the kidneys; 2 — the renal pelvises; 3 — the ureters; 4 — the urinary bladder; 5 — the urethra; *b* — microscopic structure of the kidney: 6 — a tuft of capillary loops encircled by a capsule; 7 — the convoluted tubules.

The greater part of the 24-hour volume of urine (three-fourths) is passed by children (as well as by adults) in the daytime, and only one-fourth is excreted during the night. The number of micturitions changes as the child grows older. The total volume of urine voided in 24 hours increases. The younger the child, the more frequent is micturition (Table 5).

Table 5

24-Hour Water Requirements and Normal Urinary Excretion in Children at Various Age Levels

	AGE LEVEL					
	birth-3 mos	3-6 mos	6-12 mos	1-3 yrs	3-7 yrs	7-14 yrs
Number of micturitions	25-30	25-20	20-15	15-10	10-6	6-4
Amount of urine excreted (ml)	100-500	500-600	600-750	700-800	900-1000	1200-2000
Amount of water ingested (including water constituent of food)	500-600	600-700	700-800	800-900	900-1300	1300-1500

The urine of healthy children is either colourless or light straw-yellow, and absolutely clear. Any change in the colour of the urine, its cloudiness, or a decrease or increase of the number of micturitions should alert parents, since such changes may be signs of the onset of some disease.

Treatment of kidney diseases is a difficult matter owing to the complex structure and perpetual activity of these organs. When treatment is delayed the condition may become chronic, and this is very difficult to cure. Consequently, successful treatment of kidney trouble can be guaranteed only in cases when the disease is recognised in its initial stages. Parents must bear in mind that timely medical advice and early treatment may prevent a severe chronic disease and life-long disablement.

Nephritis

Nephritis is a disease characterised by inflammatory processes in the kidneys. It usually follows some infectious disease, most frequently scarlet fever, tonsillitis, pneumonia, influenza, grippe, erysipelas or other streptococcal infections.

The lesion in the kidneys usually develops 2 to 3 weeks following recovery from the above infections. The onset may be acute and sudden, or gradual and imperceptible. It is not uncommon for kidney trouble to be unnoticed, as nephritis develops at an age when children are more or less independent and the parents have no opportunity of observing their micturitions or the character of their urine.

In view of this it is necessary to pay attention not only to symptoms characteristic of kidney diseases, but also to the child's general conduct. Kidney trouble usually makes the child apathetic, impairs his appetite; he tires easily, and complains of headache; skin pallor develops. The amount of urine voided in 24 hours decreases, even though the child drinks enough. Water is retained in the body, and an attentive mother notices morning puffiness of the eyelids or of the face. At the same time the colour of the urine changes, it becomes a reddish-brown, like water in which meat has been washed. However, these symptoms do not always all appear simultaneously. Some of them, edema, for instance, may be absent. Therefore the child must be taken to the doctor upon the appearance of the slightest suspicion of kidney trouble.

But before the doctor can be reached measures should be taken for improving the functions of the kidneys and for preventing the condition from becoming severe.

The child should be kept at strict bed rest, and warmed. Warmth is conducive to dilatation of the blood vessels (the capillaries), thus facilitating the function of the diseased kidneys. Since the excretion from the kidneys of water and waste products harmful to the body is impeded, the intake of liquid has to be restricted for some time, and some food constituents completely excluded from the diet—meat broths, meat, canned foods, salt, pungent sauces, pickled food. Children should be given a sugar-and-fruit diet: apples, lemon slices, cranberries, grapes, plums, jam, sugar, candied fruit, etc. These measures may help to avoid a serious illness. The only medication permissible before the doctor's arrival are vitamins and 10 per cent calcium chloride. Vitamin C is particularly beneficial. In no case are any so-called "kidney medicines" or sulfa drugs to be given to children as they may aggravate the kidney trouble.

As a rule kidney patients are hospitalised. After the child returns from the hospital he still shows traces of the disease; his body is ready for a relapse at any moment. A neglectful attitude in this aspect may lead to the return of the disease, or to its imperceptible transition into a chronic form.

Repeated kidney trouble responds to treatment much less readily, and tends to become chronic. Therefore after the child is dismissed from the hospital great care should be taken at home of his regimen and diet. The attending doctor will plan the regimen and diet and their duration, depending on the form, severity, and course of the disease. For a year after leaving the hospital the child remains under special medical surveillance in the local polyclinic, to which he must report once a month for examination and urinalysis. The child should be protected against general and local chilling, as chilling creates favourable conditions for nephritis.

To avoid kidney trouble children should be hardened by adaptation to various atmospheric agents and by physical exertions (manual tasks, exercises).

Any sites of infection detected in the body, such as decaying teeth, middle ear infections, sinusitis or frequent tonsillitis must be subjected to thorough medical treatment.

It is a deplorable fact that many people hold the erroneous opinion that carious milk teeth require no treatment as they will eventually come out anyhow. However, such neglect is conducive to the formation of kidney trouble, as it means retaining, for a matter of several years, sites of infection that constantly release into the blood stream bacteria and their waste products, toxins. The development of nephritis is prevented by following the above instructions and by careful observation of the child for 2-3 weeks after any disease.

Nephrosis

Nephrosis is a graver systemic disease in which the kidney lesions, in distinction from nephritis, are predominantly of a degenerative or retrogressive nature and occur in the renal tubules. Nephrosis is a chronic disease. In the majority of cases it is the outcome of nephritis (nephrotic stage).

The appearance of nephrosis may likewise be associated with the presence in the body of a chronic infection (tuberculosis, chronic pneumonia, bronchiectasis, syphilis, suppurative processes in the bones and bone cavities, in the ear, etc.). Acute nephrosis may result from certain infectious diseases (diphtheria, measles, influenza) and follow mercury, lead, or phosphorus poisoning.

A characteristic feature of this disease is the accumulation of fluid in the tissues and cavities, resulting in marked general edema. Excessive amounts of protein are excreted from the body with the urine, so that the blood is greatly depleted of protein, and this in its turn is conducive to still greater edema. Treatment is protracted.

Domestic treatment following dismissal from the hospital is based on a proper diet. The food should be of full dietary value, containing sufficient amounts of vitamins A, B, and C. Since protein is voided excessively with the urine, the food must have a high protein level. The most advisable food is cottage cheese (pressed milk curds), as it is not only a protein food, but also possesses diuretic properties. Lean meat (veal), or non-fat sorts of fish may also be given, but thoroughly cooked by boiling. Salt and water intake is restricted. The intake of water must be equal to the 24-hour urine output. The patient may remain at home, but he must be examined regularly at a special department of his polyclinic for two years after leaving the hospital.

Prophylaxis of nephrosis consists chiefly of preventing its appearance as a complication of nephritis, and of thoroughly curing all chronic infections and sites of infection.

All the prophylactic measures described for nephritis are just as suitable for nephrosis.

Pyuria

The term pyuria is a pooled concept that unites various diseases of the kidneys and urinary tract, the leading sign of which is the presence of pus in the urine.

Pyuria is associated with inflammatory processes in the different sections of the urinary system: the renal pelvis, ureters, and bladder. The condition is prevalent among children in the first two years of life. The onset frequently resembles other diseases, such as influenza, intestinal infections, meningitis. The demonstration of pus by urinalysis clarifies the general pattern of the disease.

Pyuria may be caused by various bacteria (streptococci, staphylococci, pneumococci, the colon bacillus, etc.) that penetrate into the urinary tract through the blood and lymph vessels, and also from outside through the urethra. This latter route of infection is particularly frequent in girls, and is the result of not washing the diaper area of female babies properly. The perineal areas of infant girls should be washed with warm boiled water, and the stream of water and the washing process should be directed from the vagina to the anus, that is, from front to back (from tummy to spine). If the opposite is done it is very easy to convey an infection from the anus to the short, wide urethra of the little girl. Pinworms are also often responsible for carrying infection into the urethra.

Factors conducive to the development of an infection are chilling, poor nourishment, bad care of the child's skin, faulty hygiene, various diseases (rickets, diarrhea, pneumonia), and vitamin deficiencies. Children with metabolic disorders (exudative and lymphatic diathesis) are particularly susceptible to infections.

The onset of the disease is either acute or insidious. In the latter case the child becomes languid, cries a lot, his skin is very pale and acquires a yellowish tinge, he persistently refuses food and even drink. At times the temperature rises to 37.3-37.5°C. The bladder is evacuated more frequently, while the amount voided at each micturition is much less than usual. Occasionally urination is painful and the children become restless. The older the child, the clearer are these symptoms in the general pattern of the disease.

Children, particularly girls, do not always tell their parents of their trouble, they strive to hide it. In cases where the onset is acute the above general symptoms are accompanied by a sudden elevation of the temperature to 39°C, vomiting, headache, sometimes even convulsions and partial loss of consciousness.

The treatment of pyuria, particularly in neglected cases, is no simple matter; it calls for scrupulous attention to details, patience, and a strictly individualised approach to the child and to the various stages of his disease. The child must be put to bed and given an abundant amount of liquids (tea, lemonade, mineral water). A sugar-and-fruit diet for a day or two may prove very beneficial. Vitamins A and C are also very useful.

Medicines should be given only as prescribed by the doctor, for incorrect usage may protract the disease. Measures for preventing pyuria are protection of the child against chilling and accidental ailments, and provision of nutritious food in sufficient amounts.

One of the prophylactic measures against pyuria that needs stressing is hygiene of the external genitals and anus, particularly in girls, to avoid carrying any infection into the urinary organs. Important factors in the prevention of pyuria are the formation of habits of personal neatness and of daily bowel movements, and proper rearing in general.

Night Bladder Incontinence

Late bed-wetting is encountered mostly among boys of 5 to 10 years of age. The causes of this night incontinence, or enuresis, are still not quite clear. However, it may be confidently stated that it is primarily a disease of the nervous system, not of the urinary tract. Therefore mental shock, bad upbringing, irregular sleep, fatigue and overstrain are very important factors in the appearance of this disorder.

The bed-wetting occurs at night during deep sleep and is frequently accompanied by dreams. Enuretic children often talk in their sleep, cry out suddenly, get up and walk about. These children are usually excitable and nervous, but they may also be inactive and inhibited.

Treatment resolves into restricting liquids before sleep and giving the child dry and salted food in the later part of the day—this is conducive to checking urine formation. The small amount of urine accumulating in the bladder is not enough to stimulate its evacuation. Two or three months of such a regimen usually give satisfactory results. In other cases a good effect is obtained by training the child to restrain his bladder function voluntarily for prolonged periods during the day. Bed-wetting can be prevented by bringing up the child properly, by eliminating the causes of his nervous tension, and by planning and following a suitable schedule of daily routine and sleep.

MOST FREQUENT INFECTIOUS DISEASES OF CHILDREN

Just what are the contagious diseases so common among children? Are they dangerous for the child? Can they be avoided? Young mothers often ask their doctors such questions.

In this chapter we shall dwell on the communicable (contagious) or infectious diseases of childhood. They are called children's diseases because they occur prevalently in childhood. And they are contagious because they not only endanger the health of the patient, but also of the people who surround him. Infectious diseases are caused by infinitesimal organisms—germs (bacteria) or viruses—that are dispersed in the air surrounding the patient when he coughs or sneezes, as they are present in the saliva or mucus the patient discharges. A healthy child inhales the air contaminated by the pathogenic bacteria or viruses which multiply in his body and poison him with their toxins, and the result is that the healthy child becomes ill. In other diseases the germs live in the patient's intestine (dysentery, infective hepatitis), or in other organs.

The patient's body immediately reacts to the infection by producing substances capable of combating the germs and their toxins; part of the germs (pathogenic bacteria) or viruses perish in this battle. The faculty of combating pathogens of infectious diseases one has had is in the majority of cases retained throughout the rest of a person's life, so that children do not usually contract a contagious disease a second time. This resistance to an infection that appears after recovery from this infection is called acquired immunity.

Children's infectious diseases affect children of all ages, but the majority of them are not dangerous for newborn infants and babies in the first months of their lives, as they still possess an innate immunity to these diseases acquired from their mothers. After several months this immunity is lost and the child may then contract a communicable disease if he comes into contact with somebody who has it.

Children's communicable diseases have been known to mankind from ancient times. The most common are measles, scarlet fever, chickenpox, whooping cough, diphtheria, German measles, and mumps. In former times these diseases were the scourge of the child population, reaping an annual harvest of thousands of victims. The most dangerous of them were diphtheria and scarlet fever. Subsequently doctors learned how to control infectious diseases by means of prophylactic injections against some of them. Moreover, new medicinal preparations that destroy the pathogenic agents were evolved.

In the U.S.S.R., where child welfare is a matter of state importance, great success has been attained in the drive against children's infectious diseases. Preventive injections against diphtheria and whooping cough have brought down the rate of these infections most strikingly. The mortality rate of scarlet fever and measles has decreased tellingly. However, these diseases have not been done away with completely, and their possibility should be borne in mind by all parents.

Are these diseases dangerous for children at present? The answer to this question is that healthy children of a more advanced age get over them easier; younger children, particularly when weakened by rickets, gastrointestinal disorders or frequent colds, and undernourished children are affected with greater severity, so that infectious diseases are dangerous for them. Some mothers mistakenly suppose that there is no saving the child from the contagious diseases of childhood. Indeed, almost all children contract measles and chickenpox, since susceptibility to these diseases is very high and no prophylactic inoculations against them have been evolved in medical practice to date. However, only very few children come down with diphtheria and whooping cough, and if they do they have these diseases in a mild form, thanks to the compulsory inoculation of all children against them. Moreover, it is not at all obligatory for all children to have scarlet fever, German measles, or mumps, as many of them are immune to these diseases.

The prevention of children's contagious diseases is also favoured by sanitary propaganda among the population. Every mother must know of the existence of communicable diseases, and upon the appearance of one of them she should be able to take measures against a further spread of the infection. First of all mothers must not allow their healthy children to come into contact with a sick child whose illness has not been diagnosed. On the other hand, if it is her child who has become ill she must immediately isolate him from other children before the doctor arrives, and should let the crèche, nursery school, or school her child attends know of his illness.

Children should likewise not be brought into contact with sick adults from whom they can catch some infection.

The room in which the child lives must be kept clean and aired regularly. Adults should train the child to form hygienic habits from the earliest years of life; the child's resistance to disease should be built up by various hardening procedures such as ablutions, exercises, massage, sunlight and fresh air; parents should remember that fresh air and the sun rays destroy germs.

The child's food should be of full dietary value and contain enough vitamins.

All the enumerated prophylactic measures increase the general resistance of the child toward infections and make it easier for him to overcome pathogenic germs and viruses.

Measles (Rubeola)

How is measles acquired? Measles is one of the most widespread communicable diseases owing to its contagiousness. Its causative agent is a specific virus. The child acquires the infection from a measles patients present in the same room, or in neighbouring premises if there is a current of air between the rooms. When a patient sneezes and coughs, or even just talks, he eliminates the virus intensively with droplets of moisture from his nose and throat; the virus is dispersed in the air and with this air penetrates into the respiratory tract of a healthy child when he breathes.

The incubation period (from the time of exposure to the appearance of the first symptoms of the disease) is 9 or 10 days in the majority of cases, although sometimes it may be protracted to 17 days.

Clinical pattern of measles. A child with measles becomes contagious as soon as the first symptoms of the disease appear: the child feels tired and listless, his temperature goes up, he has a cough, a running nose, and sneezes frequently. Puffy eyelids, redness and watering of the eyes, and sensitiveness to light are most characteristic features. These symptoms gradually intensify, and by the second or third day tiny red spots with white centres appear in the mouth, on the mucous membrane of the cheeks; this is followed by the eruption of a rash. The rash starts behind the ears or at the hairline, spreading down to the face; on the second day it spreads over the body, first involving the chest and back, then the extremities. Gradually the rash becomes denser; its spots are elevated above the surface of the skin; the skin surface free of spots remains pale. The condition is severest during the eruption of the rash. The temperature rises to 39-40°C, the patient is very inactive, refuses food, his face is puffy, the eyelids are swollen and the eyes half-closed owing to light-sensitivity, there is a slight purulent discharge from the eyes, and the nose runs excessively. The child is made extremely uncomfortable by a hacking cough. On the fourth to fifth day after the appearance of the rash the condition improves, the fever subsides, the rash begins to fade and then disappears rapidly, leaving brownish spots. The inflammation of the eyes also clears up. If no complications set in the disease ends by the sixth or seventh day following the appearance of the rash. The patient is contagious from the time, the first symptoms of the disease appear and for five days after the appearance of the rash. During this period he should be isolated from healthy children.

Measles is a dangerous disease, particularly for young children, who are more frequently affected by complications—pneumonia, upper respiratory catarrhs, middle ear infection, gastrointestinal disorders.

Another danger of measles is its extremely weakening effect which renders the child susceptible to other grave diseases, particularly tuberculosis.

Proper management of the measles patient is extremely important. The majority of children have measles at home, hospitalisation is rare, becoming necessary only in cases where complications have set in. Many of these complications may be avoided by handling the sick child properly. First of all, as soon as the earliest symptoms appear the child should be put to bed. There exists a widespread, but harmful, opinion that measles patients have to be kept in a dark room. This is absolutely untrue. A child ill with the measles needs more fresh air and light than a healty person does, as fresh air and light destroy the germs that accumulate in stuffy, dark quarters. The bed should stand so that the light does not fall directly in the child's eyes. The room must be aired frequently; the patient should be warmly covered during the airing.

The child's eyes are washed daily with 2 per cent boric acid, 2 per cent sodium bicarbonate (baking soda), or just plain boiled water. His food should be bland, warm, soft (milk, cereals, vegetable purée, broth, fruit juice starch puddings); he should get enough fruits and vitamins.

The child must be treated for measles under the doctor's supervision.

Prevention of measles. Children who have not had measles must not be permitted to enter an apartment occupied by a measles patient. A healthy child who has been exposed to the infection should be promptly inoculated with an antimeasles serum or with gamma globulin obtained from the blood of people who have had measles. All children from 3 months to 4 years of age who have not had measles are inoculated (the disease is not dangerous for breast-fed infants younger than 3 months, except in cases when the mother of such a baby never had measles herself). Children older than 4 years usually tolerate measles more easily, and complications are rarer. At this age the doctor prescribes injections only for children weakened by some previous infection. An inoculated child either does not contract measles at all, or has the disease in a very mild form. The serum gives only a temporary immunity of 3-4 weeks; therefore, should the child again be exposed to measles after this period the injection must be repeated. Children who have been exposed to measles have to be isolated from other children for 17 days, as they may develop the disease within this time. Inoculated children are isolated for 21 days.

German Measles (Rubella)

German measles is a contagious virus disease, milder than measles, with a rash somewhat resembling the latter.

The onset of German measles is acute, beginning with the eruption on the body of a fine rash, predominantly on the outer aspects of the arms, legs, and on the buttocks. The face and trunk are also involved, but to a lesser degree.

The patient usually feels much better than in measles. The catarrhal symptoms so characteristic of measles—running nose, coughing, sneezing, sensitivity to light—are absent. The temperature rises to 37.5-38°C or remains quite low-grade. The child does not usually complain of anything. The rash fades within 3 to 4 days, and 5 days after the beginning of the disease the child may mingle with other children again (nursery school, school).

Children who have been exposed to German measles do not have to be isolated; they continue to attend nursery school, school, or whatever child-care or educational group they are members of.

Scarlet Fever (Scarlatina)

Scarlet fever is a frequent disease of children between two and seven years of age; however older children and even adults may contract it as well. Not all people are susceptible to scarlet fever; some catch it when they come into contact with patients, others do not.

Scarlet fever is a dangerous disease. It may have severe complications that turn the child into a chronic patient. Among these complications are diseases of the kidneys and the heart and suppurative infections of the middle ear. During recent years, following the widespread introduction of penicillin in the treatment of scarlet fever, the incidence of complications and death owing to scarlet fever has gone down sharply; however, this is a tricky disease that must never be made light of. Cases have been reported when even a mild form of scarlet fever has had severe consequences.

Contagion occurs by direct contact with a scarlet fever patient or a germ-carrier (a person who is not ill himself but whose body harbours the bacteria capable of causing scarlet fever in other people). Germ-carriers are both adults and children who are frequently affected by a sore throat caused by the same bacteria that cause scarlet fever (streptococci). Moreover, the infection may be spread through objects handled by the sick child (toys, books). Scarlet fever is also transmitted indirectly, through a third person who takes care of the patient and then is around other children in the same clothes worn when caring for the patient.

Clinical symptoms of scarlet fever. It takes from 1 to 7 days from the time of exposure to the infection to the appearance of the first symptoms of the disease; occasionally this period may be protracted to 12 days. The onset of the illness is acute: the temperature goes up rapidly, the child is fretful, feels tired and asks to be put to bed. Soon he complains of pain in the throat upon swallowing. A frequent symptom of scarlet fever is vomiting on the first day of the disease. The fauces (the upper part of the throat) shows a sharply delineated redness, and sometimes the tonsils are white-coated. The cervical lymph nodes are enlarged and tender.

A fine bright-pink or red rash erupts on the first or second day of the disease. A rosiness of the entire skin surface of the body is characteristic of scarlet fever, while in measles the general background of the rash is pale. The scarlet fever rash covers the entire body, and is particularly abundant on the chest, back, and inner aspects of the extremities. The patient's cheeks are flushed, but his chin is pale. The tongue is densely coated on the first day, then it begins to peel, and by the fourth or fifth day of the disease it looks like a ripe raspberry or strawberry (raspberry or strawberry tongue).

The patient feels sick for 5 to 6 days, then his temperature returns to normal, the rash fades and the redness in the throat clears up. At this time the skin begins to peel, particularly around the finger-nails and toe-nails, and on the palms, where it comes off in layers.

In mild forms of scarlet fever (partly obliterated) all the symptoms of the disease are very weak. Such cases may pass unnoticed and be a source of infection for other children.

Scarlet fever patients are usually hospitalised. Occasionally a child may be treated at home if he has a mild form of the disease, and if the domestic conditions are such that proper handling and care are ensured, and there are no other children. After a patient has been removed to the hospital thorough disinfection of the home is necessary. When the child is kept at home all the things he comes into contact with, and the room he is in, are disinfected ten days after the onset of the disease, when he is already on the way to recovery. Domestic treatment of the scarlet fever patient must be supervised by the doctor.

Currently the hospitalisation period lasts only ten days. Medical researchers have proved that the complications that usually occur in the second or third week of scarlet fever are due to re-infection of the child with the germs present in the throats of other patients. It has therefore been found advantageous to isolate the child at this time and keep him at home for another 12 days after the hospital, thus shielding him from other infections. After this period the child himself is no longer dangerous for other people.

The scarlet fever patient needs to be given proper care of at home. The rooms must be kept clean. The child's diet should consist mainly of dairy and vegetable foods, with no pungent constituents, and the vitamin level must be high enough. After the fever has subsided meat and fish dishes are added.

Prevention of scarlet fever. Any sore throat complaint must be carefully attended to. The child should be put to bed and his temperature taken, and he should be isolated from healthy children before the doctor's arrival. In no case is a sore throat to be treated without medical advice. Scarlet fever may occur in a very mild form, and if the mother misses it other children may catch it. Moreover, mild forms of scarlet fever may be superimposed by severe complications that will keep the child in bed for a long time.

A healthy child who has been exposed to scarlet fever infection is isolated from other children for 7 days.

Mothers should remember that scarlet fever can be transmitted through third persons, therefore they should never take their children to crowded places if this is not absolutely necessary.

Whooping Cough (Pertussis)

Whooping cough still remains one of the most widespread of childhood diseases, and it may attack children of any age, even newborn infants. The infection is transmitted by coughs and sneezes, and by contact with the discharge from the nose and throat which contains a large amount of the whooping-cough germs, bacteria known as *Bacillus (Hemophilus) pertussis.* Whooping cough is a serious disease that breaks down the body's resistance and renders the child susceptible to other diseases, especially to pneumonia which may develop into a chronic form. Whooping cough is particularly dangerous for infants; during the coughing spells convulsions and loss of consciousness are possible; in infants bronchitis and pneumonia are more frequent than in older children; the latter complication is the principal cause of death due to whooping cough.

Course of whooping cough. The first symptoms of the disease appear within three to fifteen days after exposure (5-8 days on the average) in the form of a slight, dry cough. Sometimes the temperature may rise a little, signs of a mild cold are present. The cough gradually gets worse until finally, usually in one or two weeks, it becomes paroxysmal, coming in spells or bouts, mostly during the night. The child coughs eight or ten times in one breath, and this is followed by a forcible noisy intake of air making a crowing sound which is known as the whoop. There may be several such coughing spells;

one bout lasts from 1 to 3 minutes and ends with the ejection of a thick mucus, sometimes with gagging and vomiting.

During the attack the child's face flushes, or occasionally becomes blue, the tongue protrudes from the mouth, the eyes are blood-shot and watery. Following a coughing spell the child is utterly exhausted. Such spells are repeated 10-20-30 times during the day and night.

Whooping cough lasts for several weeks (from 2 to 8); during this time the child's appetite is poor, he loses weight, becomes extremely irritable, sleeps badly at night. Gradually the cough easens up, the spells are less frequent and finally stop altogether.

Treatment of whooping cough. Care of patients. The severity of the case depends principally on the time of diagnosis. When the diagnosis is established before the whoop appears the subsequent course of the disease may be greatly alleviated by the administration of powerful therapeutic agents—antibiotics. Consequently, a mother should have her child examined by the doctor immediately she suspects whooping cough. Treatment instituted when the whoop is already apparent is much less effective.

The chief agent for combating the full-fledged form of the disease is fresh air; the coughing spells are usually much less severe outdoors than indoors. It is advisable to have patients sleep out in the fresh air in all seasons of the year when the atmospheric temperature is above minus 12°C. Naturally, the child must be wrapped up warmly and all measures taken against chilling. A lesser effect is obtained when the child sleeps in a room with part of the window or a transom open. It is positively harmful for a sick child to be kept for a long time in a badly ventilated room. It is a long-known fact that the coughing spells are fewer when the child's attention is distracted. Therefore a suitable selection of toys, recreation, and books alleviate the coughing spells. Long walks near a river, lake, or the sea, where the child can breathe freely and run about are very good for him. Since the patient loses the greater part of his food when he vomits it is recommended to give frequent small feedings of concentrated, high-calory food with a rich vitamin content.

Prevention of whooping cough. To avoid danger of exposure to whooping cough mothers should try, as far as possible, not to take their children to places where they might come into contact with patients in the initial phases of the disease, even though their cough has not reached the characteristic whooping stage yet. Contact with such children is dangerous, as they already diffuse the whooping-cough germs.

As soon as a mother notices that her child coughs she should get him to the doctor. If there is suspicion of whooping cough the child should be kept at home and isolated from other children. Mothers must remember that children who have whooping cough are a menace to other children for six weeks from the beginning of the disease; therefore the child should be isolated during this period, as far as possible, from healthy children who have not had it. If this is impossible the child should be hospitalised.

At present immunisation against whooping cough is widely practised, and with very good results. The incidence of whooping cough among children goes down from year to year.

Diphtheria

Diphtheria is a severe infectious disease. Its death rate was formerly very high, as physicians did not know how to overcome or prevent it. However, at present diphtheria has become a rare disease; in Leningrad, for instance (one of the largest cities of the Soviet Union) it has been almost completely eradicated. This excellent result was attained by expedient management of mass immunisation against diphtheria.

Diphtheria may attack not only children, but adults as well.

Contagion. Diphtheria is caused by a specific germ, the diphtheria bacillus, which is spread from the mouth of an infected person to one who is close by. Besides, germ-carriers may also be a source of infection; germ-carriers are seemingly healthy people whose throats are inhabited by the diphtheria bacillus.

Course. After penetrating into the body of a healthy child the diphtheria germs multiply intensively, liberating a very toxic substance—diphtheria toxin—which poisons the entire system.

The first signs appear within two to ten days after exposure to the infection. The disease begins with malaise, fretfulness, a low-grade fever; the patient may have no pains in the throat. The doctor diagnoses diphtheria by examining the mouth and throat. The throat may be red at first, but soon greyish-white spots appear on the tonsils; in a few days these spots run together, forming thick membranes, and there is an unpleasant sickly-sweetish odour from the mouth. The cervical glands become enlarged. This is a typical aspect of pharyngeal diphtheria. The course may be a very severe one, with the fever going up to 39-40°C, extreme pallor and listlessness; the membranes spread over the fauces and the swelling in the neck increases acutely. The patient's condition deteriorates rapidly, and measures to save his life must be taken.

The most serious type of the disease is the *laryngeal form*, or *diphtheritic croup* (true croup). This form mostly affects children younger than three years of age. The child develops a barking cough and hoarseness, then he almost completely loses his voice, breathing becomes difficult to the point of suffocation, and death may occur if urgent medical aid is not forthcoming. Aid consists of inserting a tube through the larynx or through an incision made in the throat; air is delivered to the lungs through the tube. This grave condition is due to the presence in the larynx of thick diphtheritic membranes that obstruct the narrow opening in the voice-box (the larynx) and make breathing impossible.

Children may also be affected by other types of diphtheria, such as diphtheria of the nose, eyes, vagina. Penetration of the diphtheria germs into the umbilical wound causes diphtheria of the navel in the newborn.

The complications of diphtheria are also dangerous, including heart trouble (myocarditis), paralysis of the arms and legs, and of the soft palate that makes the act of swallowing impossible (the food comes out through the nose). The most threatening, and in some cases lethal, complication of diphtheria is paralysis of the heart.

How to help the diphtheria patient. The doctor must immediately be called to see the child; if the diagnosis is confirmed the doctor will inject him with an antidiphtheria serum (antitoxin).

Timely injection of the antitoxin is conducive to a favourable course of the disease as it has an immediate effect on the diphtheria toxin which poisons the patient's system and is the cause of all the severe complications.

A child with diphtheria should be taken to the hospital, as only there can urgent aid be given if it becomes necessary. The patient needs complete bed rest throughout the entire acute period of the disease. He should be given a soft, mild diet with a high vitamin level.

Prevention of the further diffusion of the disease. After the patient has been taken away to the hospital his home is subjected to thorough disinfection, as the diphtheria bacillus is very stable and retains its viability for a long time after it dries up on clothing, toys, and other things contaminated by the patient.

Any child who has been exposed to contagion is tested for the presence of the diphtheria germ in the moisture or mucus obtained from his nose and throat, and is allowed to attend his nursery school or school only with the doctor's permission.

The principal measure for combating diphtheria is immunisation by antidiphtheria (diphtheria toxoid) injections.

Chickenpox (Varicella)

The source of infection is a chickenpox patient. The pathogenic agent is a virus which spreads very rapidly through the air over considerable distances and may be transmitted to children in neighbouring rooms, apartments, or even houses. Susceptibility to chickenpox is very high. As a rule, all children who have been exposed contract the disease.

Chickenpox is not dangerous for healthy children; however, it may become severe in an emaciated child, or in a child weakened by some recent infectious disease.

Complications are relatively rare. They consist of suppurative skin conditions, erysipelas, inflammation of the mucous membrane of the mouth.

Children of all ages are affected by chickenpox; only the newborn have it rarely as they retain the immunity conferred on them by their mothers.

Course of chickenpox. The incubation period varies from 11 to 21 days. The disease begins with a slight fever and an almost simultaneous rash. This rash first appears in fine spots; within several hours the spots turn into tiny water blisters surrounded by narrow red rims. In a day or two these blisters break and dry up into crusts that later fall off. The rash crops up on all parts of the body, even the scalp. Sometimes the blisters (pox) may be very few, in other cases they may densely cover the entire surface of the body. The pox may cause intense itching that makes the child very restless. By scratching the blisters the child breaks them and infects the lesions with various germs; this leads to complications in the form of boils. To relieve the itching and avoid a secondary infection the blisters are painted with a 4-5 per cent solution of potassium permanganate or a 2 per cent alcohol solution of brilliant green. The child's hands should be scrupulously washed with soap several times a day, and his finger-nails must be kept very short. The body linen and bed clothes should be changed frequently.

Chickenpox patients must be quarantined until they recover. Children who live at close quarters (in the same apartment) must be kept home for some time, to avoid spreading the infection to the child-care establishment or school they attend.

Mumps (Epidemic Parotitis)

Mumps is also an infectious disease. It is contracted from a person who has it; patients are infective up to the 7th or 9th day of the disease. The incubation period lasts from 11 to 23 days. The disease begins with a fever, sometimes a high one (38-39°C), and a swelling of the parotid glands in the hollow just under the lobe of the ear (occasionally the swelling is quite considerable). Chewing becomes difficult, the patient may be able to take only soft, light food (cereals, vegetable purée, milk, broth, starch puddings). Sometimes the swelling involves both sides. The shape of the face alters, becoming unusually round and acquiring a sullen look, hence the name "mumps", from the old English word for a grimace or sullen face—"mump". The temperature goes down after several days, and the swelling gradually subsides. The child must be kept at home until all signs of swelling or tenderness of the parotid glands have disappeared. The child is treated at home under the doctor's guidance. Warm compresses for the affected area are recommended.

In rare instances mumps develops certain unpleasant complications, among which are inflammation of the pancreas in the abdomen, inflammation of the testicles in boys, and meningitis; the mumps patient should therefore be kept in bed until his temperature returns to normal, and be protected against chilling; he requires vitamins in abundance.

Children who have not had the mumps and have been exposed to it are quarantined at home from the 11th to the 21st days following exposure.

Infantile Paralysis (Poliomyelitis)

Infantile paralysis, or poliomyelitis (polio), is a severe infectious disease. Quite recently—only a few years ago—it was frequently observed in many parts of the U.S.S.R. The disease was also widespread in other countries; epidemics were registered in the U.S.A., Great Britain, and other countries. Polio annually turned many healthy youngsters into handicapped invalids who were bedridden for long years. Sometimes terminations were fatal.

Medical researchers have in recent years expended stupendous efforts on the creation of a vaccine that would protect children against this dire disease. Such a vaccine already exists, and immunising inoculation is carried out on a wide scale in the U.S.S.R. and in a number of other lands. Vaccination has led to a striking drop in the incidence of polio in general, and of its severe forms in particular.

Poliomyelitis is caused by a filtrable virus discharged from the upper respiratory tract and intestine of affected people. The virus may also be harboured by a person who does not become ill himself, but remains a virus-carrier; such carriers are also a source of infection to people they come into contact with. Polio mostly affects young children, but it is not uncommon among older ones and among adults.

The incidence of the disease is usually of a seasonal nature, higher in the summer and autumn and lower in the winter and spring.

Course of the disease. Poliomyelitis is principally a disease of the nervous system. The virus penetrates into the cells of the brain and spinal cord and destroys these cells, a process reflected in the onset of paralyses in different parts of the body; the legs are affected most frequently, then the arms, while the muscles of the neck, abdomen, and face are least affected. Involvement of the nerves controlling respiration and swallowing is particularly dangerous.

The incubation period of the virus following exposure ranges from 5 to 14 days, although in some cases it may be longer or shorter.

Onset is acute: the temperature goes up, and a running nose, cough and redness of the throat develop. The patient complains of severe headache, pains in the back and in the arms and legs, particularly when he moves them; convulsions are not rare in very young children. The child is very apathetic and drowsy, or, quite the opposite, becomes irritable, suffers from sleeplessness, is delirious. Increased perspiration is quite noticeable.

From 2 to 5 days following the onset of the disease a weakness (paresis or mild paralysis) appears in various parts of the body. The mother notices that her child no longer rests on one or even both feet, or does not take his toys into his hands; occasionally paralysis of the facial nerve is observed, twisting of the face to one side; sometimes swallowing is impaired and liquid food pours out of the nose.

The paralytic period lasts for one to two weeks and is followed by a restorative period which may be quite protracted, lasting from one to three years. Active motor functions gradually re-appear in the extremities, the atrophied condition of the muscles improves; however, in some cases stable paralyses remain throughout life owing to the destruction of a great number of nerve cells.

The course of the disease may be atypical, resembling meningitis, or its signs and symptoms may be so mild that it is mistaken for a cold or stomach upset. First the mother suddenly notices that the child does not use a leg properly and that his gait has changed. In some children polio may occur in a form so mitigated that it is not diagnosed at all. Such children are a menace to the people they come into contact with, as they may be a source of infection.

Treatment and care of poliomyelitis patients. Upon the slightest suspicion of polio the patient should immediately be isolated and hospitalised in a special polio ward, while his home must be disinfected. All children who were in contact with the patient, as well as all adults occupied in child-care establishments, public food catering enterprises, and water supply stations are quarantined for 20 days.

The contacts are visited daily by a nurse from the polyclinic who examines them and takes their temperature. If an exposed person becomes indisposed, or his temperature rises a doctor is called; the latter determines the diagnosis and the subsequent treatment of the patient. If necessary this person is hospitalised.

All children who have contracted polio must be provided with timely and adequate medical services in a hospital. The earlier treatment is instituted the more hope there is for a favourable outcome of the disease and for restoration of the functions of the affected parts of the body.

Thanks to the employment of special equipment providing artificial respiration for prolonged periods of time it has now become possible to save the lives of many patients afflicted by severe forms of poliomyelitis accompanied by respiratory disorders.

Infectious Hepatitis (Catarrhal Jaundice)

This disease, also known as the Botkin disease, epidemic or viral hepatitis and epidemic jaundice, is a very widespread infection. It chiefly affects children and young adults.

The disease is caused by a virus that invades the entire system of the patient and accumulates in the liver. The resultant injury to the hepatic (liver) cells impairs the function of the liver, and therefore bile pigments enter the blood stream, causing yellowness of the skin and mucous membranes, hence the disease is also called jaundice. However, hepatitis may be unattended by jaundice.

Patients who have the disease are the chief source of infection. The mild, insidious form of hepatitis, and the form in which jaundice is absent are most dangerous for people the patient comes into contact with. Healthy virus-carriers are also not uncommon. The virus is contained in the stool and urine of patients and carriers. The infection is transmitted either by direct contact or through contaminated food and water. Flies may also be responsible for transmission of the virus. The incidence of infectious hepatitis is higher in the autumn and winter months than in the spring and summer.

Course of the disease. The incubation period varies between 15 and 50 days. This is the so-called latent period. The first symptoms are malaise, lassitude, headache, sometimes nausea, vomiting, abdominal pains, occasionally diarrhea or constipation, and acute impairment of appetite. Sometimes the disease may begin with a head cold, a cough, elevated temperature, and redness in the throat, a condition that is at first diagnosed as an upper respiratory catarrh.

Some days after the onset of the disease (3-7-10) the stool turns a pale chalk-like colour and resembles lumps of clay, while the pigmentation of the urine becomes so concentrated as to make it look like dark beer. The skin takes on a yellow tinge. The liver is enlarged and tender. The child is very languid and irritable at this time, sleeps restlessly, and his appetite is poor or absent. The jaundice usually lasts for about ten to twenty days, then the condition gradually improves: the skin, mucous membranes and sclera (whites of the eyes) become pale, the dimensions of the liver subside, and the patient is well on to recovery. Convalescence is slow, sometimes taking several months. In rare instances the disease may acquire a chronic form.

The severity and outcome of the disease depend to a large extent on timely measures which include proper schedule, diet and treatment. The earlier the diagnosis, the more effective the treatment. The child should be examined by the doctor even when he shows only mild upper respiratory symptoms, or is slightly indisposed, particularly if cases of infectious hepatitis are known to have occurred in the neighbourhood.

In suspected cases of the disease the child should be placed in a separate room or behind a screen (pending the doctor's arrival), and he must have his own bedclothes, towels, dishes, and chamber. The bedclothes, body linen and towels of the patient are disinfected in 1 per cent chloramine (chlorazene), the soiled dishes are boiled in 2 per cent soda, and the excreta and food remains are disinfected by flooding them with 10 per cent bleaching powder (calcium hypochlorate mixture) for 2 hours before disposing of in the usual manner.

All children with infectious hepatitis should be in a hospital where there are all the conditions necessary for effective treatment. When the child has been taken away his home has to be disinfected. All persons who were in contact with the infection are placed under medical surveillance for 50 days from the time of isolation of the patient. The general state of these contacts is checked, the colour of their skin and mucous membranes is examined regularly, and the colour of their urine and stools is also checked.

Children with whom the infectious hepatitis patient has mingled are given gamma globulin injections to prevent the disease from developing in the nursery school or school.

Any suspicion of infectious hepatitis in exposed persons requires their immediate isolation and hospitalisation.

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We have come to the end of our exposition on the most frequent children's diseases. By following our advice faithfully parents will help the health service staff in preventing many of these diseases, and if their child does contract one of them he will get better more rapidly.

IMMUNISATION AGAINST CONTAGIOUS DISEASES

Contagious or infectious diseases undermine the child's health considerably, therefore all measures should be taken to protect the child against infections.

Infectious diseases are caused by pathogenic bacteria or other microorganisms that multiply in the body and have a harmful effect on it. These organisms (germs and viruses) are capable of producing poisonous substances, or toxins, that poison the body.

However, a disease does not necessarily develop in the body its causative agents have penetrated; the body itself must be susceptible to this disease.

It has long been known that people who have had some infectious disease do not usually get it again, or if they do they have it in a very mild form.

The state whereby the body resists and overcomes infection is called immunity.

What conditions the immunity of a living organism to one or another infection?

Immunity is a most complex phenomenon in which various protective reactions of the body participate. There exist both specific and non-specific factors of resistance.

A well-planned schedule, proper diet, regular outings in the fresh air and inurement of the body to various environmental factors are all instrumental in strengthening the body and building up its resistance to disease. And at the same time prophylactic (preventive) inoculations are also very important for the prevention of infectious diseases.

What are prophylactic inoculations? On what are they based and how are they given?

The fact that a person becomes immune to an infectious disease after he has once had it gave rise to the question of the possibility of inducing this non-susceptibility in man by some artificial means. Perhaps inoculation with weakened strains of the infection-germs would make a person immune to the given disease without causing any severe form of it?

In the 18th century an English physician Edward Jenner discovered that milkers who handled cows affected with cowpox (vaccinia) developed blisters on their fingers, and subsequently became immune to human pox—smallpox. In 1796 Jenner publicly inoculated an 8-year-old boy with cowpox, using the fluid from a blister on the finger of a milkmaid, and the boy did not contract smallpox. In this manner it was proved that inoculation with cowpox produced immunity to smallpox. Jenner's method was called vaccination (from vaccinia, the Latin for cowpox), and the matter used for vaccination was called a vaccine.

The introduction into the body of a vaccine became known as preventive inoculation. Many researchers pooled their efforts in evolving means and methods of inoculation that would produce artificial immunity.

Vaccines contain either killed, or weakened living, pathogens of infectious diseases, or the poisonous products of their activity rendered harmless (detoxified).

Inoculation is done either under the skin, on its surface, or through the mouth or nose, depending on the specific features of the vaccine. Preventive inoculation boosts the resistance of the organism and is conducive to the formation of certain substances, antibodies, in a manner similar to what occurs in the process of development of any infectious disease. The immunity created by vaccination is known as acquired immunity, and it may be retained for a number of years.

It has been established that infectious diseases may be prevented or mitigated by inoculating children with protective substances (antibodies) contained in the blood of another person who has had the given disease. This immunity is called passive immunity, and it lasts for only 3 or 4 weeks.

Inoculations against a given infectious disease are repeated several times. The first inoculation is called vaccination and it is usually done in two, three, or less frequently, one stage. In order to consolidate and prolong immunisation booster shots (revaccination) are given over certain intervals.

The necessity for completing a full course of inoculations must be stressed, as only thus can maximum immunity be attained.

Vaccines are usually introduced under the skin (subcutaneously), or through the surface of the skin. The site of inoculation usually reddens, swells and becomes tender. Occasionally a slight elevation of temperature is noted, and some mild general feeling of illness; however, these symptoms rapidly disappear and the person becomes immune to the disease against which he was inoculated. Some types of vaccines are taken by mouth; they usually have no side effects at all.

Thus we see that while preventive inoculations are absolutely harmless they confer complete protection against infectious diseases, or mitigate their severity, leading to a favourable termination of the disease.

The vaccines that have already been evolved and introduced into medical practice create immunity against many diseases, including tuberculosis, smallpox, diphtheria, whooping cough, epidemic influenza, poliomyelitis, typhoid, paratyphoid fevers, dysentery, cholera, lockjaw (tetanus), brucellosis (Malta fever), typhus. We shall discuss some of them.

Tuberculosis (BCG) vaccine. Newborn infants are inoculated against tuberculosis in the maternity hospitals. The vaccine is given by the mouth in a small amount of breast milk, three times: on the third, fifth, and seventh, or fourth, sixth, and eighth days following birth. The child acquires immunity to tuberculosis 3 to 4 weeks after the first inoculation. Until then he should be carefully shielded against possible infection with tubercle bacilli. To prolong the immunity healthy children and adolescents are revaccinated.

In the Soviet Union revaccination is performed when the child is two and seven years old, and when he is in the fourth, seventh, and tenth grades of school. Revaccination is done either subcutaneously or by the skin abrasion method. Many investigations have been carried out in the study of the antituberculosis vaccine, and they have confirmed its absolute harmlessness and high efficiency.

Smallpox vaccine. Since inoculations against smallpox are compulsory for the entire population the disease has been completely eradicated in the Soviet Union. However, there is always the possibility of its being brought in from neighbouring countries. Therefore the Soviet public health service organs enact various measures for its prevention, prophylactic vaccination being the most important.

Vaccination against smallpox is done after the infant is three months old. The procedure in the U.S.S.R. is to place a drop of vaccine on the skin of the arm and make several scratches through it.

The reaction to the smallpox vaccine in man is usually mild, and is manifested by a reddening of the skin and blistering in the site of inoculation. The vaccination has taken if at least one small blister forms in this area. The child may be bathed during the first three days following vaccination, but beginning with the fourth day and until the scab falls off the site of vaccination must not be wetted.

The vaccination creates immunity to smallpox by the seventh to ninth day after inoculation.

Smallpox revaccination is done when the child is 4 or 5 years old, and subsequently at the ages of 8, 12, and 18 years.

Diphtheria toxoid. Inoculations against diphtheria are performed with anatoxin or toxoid. Toxoid is the poisonous substance produced by diphtheria germs — the diphtheria toxin and rendered non-poisonous (detoxified) by moderate heat and chemical treatment with formaldehyde. The first injection of the toxoid is done at the age of 5 or 6 months, and it is repeated within 3 to 4 weeks. The interval between these two injections may sometimes be prolonged to 5 or 6 weeks. Three to 6 months later the first revaccination is performed, after which the child acquires a stable immunity against diphtheria for a period lasting between 3 and 5 years. Booster injections are therefore necessary every three years until the child is twelve years old. Children over 12 are injected only if there is an increased incidence of diphtheria in the neighbourhood.

Pertussis vaccine. All children younger than seven years of age are inoculated against whooping cough (pertussis). Older children are inoculated only when the disease is widespread in their neighbourhood.

Children younger than seven who have been inoculated against diphtheria are given three pertussis vaccine injections over monthly intervals.

A combined vaccine that contains both the killed whooping cough germs and the diphtheria toxoid is at present extensively used.

The combined vaccine injections are commenced when the baby is 5 months old; three injections are given over monthly intervals. The greatest permissible interval between the first and second injections is two months, between the second and third, three months. The first revaccination is done six months after the last injection and is repeated when the child is 3 years old.

Poliomyelitis vaccine. Inoculation against this severe and frequently disabling disease has now been introduced on a wide scale throughout the world.

In 1954 an American researcher, Dr. Jonas E. Salk, succeeded in preparing a vaccine containing the polio virus killed with formaldehyde.

In the Soviet Union Professor M. Chumakov and his associates in the Poliomyelitis Institute have mastered and improved the complicate process of obtaining the vaccine from the killed virus after the Salk method, and have obtained a Soviet vaccine.

Since 1956 mass inoculation against polio has been instituted. Three inoculations are given over 3 to 6-week intervals between the first and second inoculations, and one year between the second and third. The most susceptible section of the population—from 2 months to 20 years of age—is inoculated first.

Besides the vaccine containing the dead virus, A. Smorodintsev and M. Chumakov recently succeded in preparing a living vaccine against polio, after the method proposed by the American bacteriologist Albert B. Sabin. This vaccine is given by mouth in lesser amounts than the killed vaccine; it does not cause any symptoms of the disease, but is conducive to the formation in the human system of antibodies conferring immunity to polio. The living vaccine may be given to babies older than 2 months three times over 3 to 4-week intervals. The living vaccine is available in drops and sugar-coated pills (the latter for older children).

Measles vaccine. In recent years Soviet medical researchers have developed a vaccine against measles. Special tests of this vaccine are now (1964) in their final phase, and it will evidently soon become an important asset in controlling the disease.

Up to now the prevention of measles has been performed with an antimeasles serum (human measles immune serum or measles convalescent serum) containing antibodies that detoxicate the measles virus. This serum is prepared from the blood of adults who have had measles. All children who have not had the disease are inoculated with this serum if they have been exposed to the infection at ages ranging from 3 months to 3 years, and at more advanced ages if they are ill or have been weakened by some previous illness. The inoculation is effective when it is given no later than on the seventh day following exposure.

Another preventive against measles is a special preparation called gamma globulin; as the concentration of the antimeasles antibodies is high in gamma globulin it is injected in lesser amounts than the antimeasles serum (3 ml of gamma globulin instead of 30 ml of measles convalescent serum). The immunity acquired by inoculation with both serum and gamma globulin is passive; it is retained for no longer than 30 days.

Inoculations against intestinal infections. Of these the most medically important is the inoculation against dysentery, the most frequent intestinal infection.

Prophylactic inoculations against dysentery are performed with vaccines containing the killed germs of several infectious diseases. The vaccine mostly used is the tetravaccine which contains the killed germs of typhoid, paratyphoid and two of the most common pathogens of dysentery (*Bact.* [*Shigella*] *sonnei and Bact.* [*Shigella*] *flexneri*).

Injections against intestinal infections are frequently combined with the tetanus (lockjaw) toxoid. The tetravaccine is injected subcutaneously three times over intervals of ten days. The tetanus toxoid is introduced together with the first and third injections. Sometimes the tetravaccine is given in tablets.

Immunisation against intestinal infections and lockjaw is likewise secured by means of a polyvalent vaccine containing 6 species of killed bacteria (typhoid, paratyphoid A and B, two types of dysentery, and cholera) and the tetanus toxoid. The polyvalent vaccine is given once. Revaccination is performed twice, in the 2nd and 3rd years after the initial vaccination.

Protection against intestinal infections is also obtained in certain cases by a bacteriophage, a living substance that is capable of causing lysis of bacteria. Bacteriophage is given to all persons who have been in contact with a patient (in case of cholera, for instance).

Rabies vaccine. The eminent French scientist Louis

Pasteur was the first researcher to use attenuated rabies virus vaccine for the prophylaxis of rabies (hydrophobia). The offices where these inoculations are performed are now called "Pasteur Stations".

To ensure timely inoculation all people who have been bitten by animals must report to the nearest Pasteur Station immediately, independent of whether the animal is patently rabid, whether nothing is known of it, or whether it appears quite healthy.

People who have been scratched by animals should also report for vaccination to the inoculation stations.

The number of inoculations against rabies depends on the site and nature of the bite. These injections are painless and, as a rule, harmless. Immunity is acquired in two to two and a half weeks following the last injection, therefore they should be started right after the bite has been sustained, since the incubation period varies between 3 and 12 weeks and stable immunity can only be acquired by completing a full course of inoculations.

Influenza virus vaccine. Inoculations against influenza are done with a living vaccine given by mouth (it is placed under the tongue where it gradually dissolves). In the U.S.S.R. such vaccines have been prepared by A. Smorodintsev, V. Zhdanov, N. Solovyov, and M. Sokolov.

The anti-influenza vaccine creates an active immunity against the disease in the inoculated person. It is usually given to adults. A good effect is obtained in children (as well as in adults) by blowing into their nostrils antibody preparations which lend a passive immunity against influenza. An anti-influenza serum of this type was obtained by A. Smorodintsev. A still better effect is produced by a combined preparation (also developed by A. Smorodintsev) containing the anti-influenza serum, penicillin and norsulfazole (sulfathiazole). This substance is a powder inhaled into the nose (or blown in with a rubber bulb); patients inhale 0.25 g of the preparation 2-3 times a day; the prophylactic dose is once a day for 3 days.

Children younger than 3 years of age are given half a dose, but only with the doctor's permission.

Immunisation against other infectious diseases. Potent vaccines against a number of other infectious diseases have been obtained in the U.S.S.R.; these vaccines are administered as the necessity arises. They include effective inoculations against brucellosis (Malta fever, Bang's disease), tularemia (rabbit fever), anthrax, epidemic typhus, spirochetal jaundice, tick-borne encephalitis, Q fever, and a number of other diseases.

The creation of new vaccines and serums is under way in the Soviet Union, and with promising results.

Thus medical science is now armed with reliable weapons for preventing infectious diseases.

However, parents are not always aware of the value of preventive inoculations and are not always cooperative. Sometimes a mother, out of mistaken pity for her child, does not bring him to the children's polyclinic for inoculation, or does not complete a course of inoculations. By this she harms her child greatly, endangers his very life. Children who have not been inoculated against infectious diseases contract them more easily and have them in more severe forms than immunised children do.

INFECTIONS OF THE THROAT
(*Sore Throat and Tonsillitis*)

Sore throat is a most common ailment among both children and adults. One of its names, "angina", means "strangling" or "throttling" in Greek, and the name of one of its forms, quinsy, comes from the old French word meaning "dog-throttling". There are many throat conditions designated as sore throat (pharyngitis), but the most widespread is acute tonsillitis. Acute, or true tonsillitis is a definite systemic infection characterised by an acute inflammatory process, primarily in the area of the tonsils. It is rare in babies younger than 8-9 months of age owing to the immaturity of their tonsils. True tonsillitis is mostly seen in children with chronically infected tonsils, or with congenital deformity (enlargement) of the tonsils. The most vivid and constant symptom of tonsillitis is pain in the throat; however, this disease is a generalised, not a local, infection that may have a drastic effect on many vital organs of the body.

Acute tonsillitis is caused by many different bacteria. The germs may be inhaled into the respiratory passages during contact with patients, or they may be acquired through cups, plates, spoons, etc., used by the patient. Very often perfectly healthy people, as well as people who have recovered from some simple "cold" may be carriers of pathogenic germs; when these germs penetrate into the body of a child whose immunity is low he develops acute tonsillitis.

Tonsillitis may occur in another way, too. Decayed teeth and chronically inflamed tonsils harbour infections that are subdued up to a certain point by the protective substances in the body; when a child who carries such a dormant infection in his system is subjected to prolonged chilling, overstrain, or when his body is weakened by some other cause the hitherto inactive harmful properties of the germs are extremely intensified, and the weakened child, having no strength to resist their effect, falls ill.

Protection against tonsillitis resolves into elimination of all factors that lower resistance to disease and decrease immunity (chilling, emaciation, exhaustion, nervous tension); bad teeth and chronic inflammation of the tonsils should receive timely treatment. An important factor in the prevention of tonsillitis is the protection of healthy children against exposure to this as well as to other diseases, such as upper respiratory catarrhs, grippe, influenza, head colds, measles, scarlet fever, chickenpox, German measles and some other infectious diseases are also accompanied by sore throat.

The most important of the infectious diseases in which one of the symptoms is a sore throat is diphtheria, since it is frequently quite difficult to distinguish tonsillitis caused by streptococcal infection from diphtheritic sore throat. Delayed treatment of even seemingly mild cases of diphtheria may have very grave consequences, therefore all parents should be aware of the necessity of promptly calling the doctor.

Various forms of tonsillitis. In order to be able to comprehend what this means, one has to know the anatomy of the throat of a healthy person. If you open your mouth wide in front of a mirror you will see, in back of the tongue, the fauces, the part that connects the mouth with the throat. It is delimited by the soft palate, the palatine arches, the base of the tongue, and on both right and left sides, the tonsils, almond-shaped structures consisting of lymph glands and lymph vessels. In all there are eight tonsils. The two largest which are visible in the throat when the mouth is opened are the faucial tonsils. A third one, the pharyngeal tonsil or adenoid, is situated at the back of the throat behind the nose. The fourth tonsil is situated at the base of the tongue; this is the lingual tonsil. Besides these four chief tonsils there are also accumulations of lympth tissue in other parts of the throat: at the openings of the Eustachian tubes behind the posterior pillars of the fauces, and occasionally in the larynx (voice-box).

All these formations taken together are known as the lymphatic or tonsillar ring. The tonsils are coated with the same pink mucous membrane that lines the mouth and throat. The surface of the faucial tonsils is uneven and wrinkled, as it is covered with numerous openings or clefts that are known as crypts or lacunas. A great number of germs accumulate in the crypts; sometimes films (or plugs) are formed, consisting of congregations of sloughed mucosal cells, decomposed white blood cells (leukocytes), food particles and, occasionally, foreign particles. Among the various inflammatory diseases affecting the tonsils true tonsillitis takes first place.

There are several forms of tonsillitis, depending on the nature of the lesion: catarrhal, follicular, and lacunar tonsillitis.

Catarrhal tonsillitis begins with malaise, pain on swallowing, fever, impaired sleep and appetite. When inspected with the aid of a spatula or the handle of a teaspoon the faucial tonsils are seen to be red and swollen. Enlarged and tender lympth nodes are palpated in the corner of the jaw and below it. The pain caused by swallowing increases with every hour, becoming most intense on the second day of the disease. The temperature goes up to 38-39°C. The child may complain of headache, and, in rare instances, may become delirious. In more severe cases pinpoint hemorrhages appear on the mucous membrane of the throat, while the uvula and the palatine arches are swollen. Catarrhal tonsillitis is often a constituent of many other infectious diseases, such as measles, scarlet fever, diphtheria, etc., therefore the doctor should be called promptly following the first symptoms of a sore throat.

The course of follicular tonsillitis differs from that of the catarrhal form. The onset of the first is usually more sudden, and the fever is higher. The throat is also red and the lymph nodes are enlarged. However, on the second day of the disease yellowish or whitish-yellow spots appear, projecting above the surface of the mucosa.

Follicular tonsillitis is a graver and more protracted disease than catarrhal tonsillitis, and it is more apt to have complications. The soreness in the throat is very painful. The patient cannot sleep, his appetite is completely absent. Pains in the joints and headache are frequently observed. Saliva secretion increases noticeably.

No less serious a disease is lacunar tonsillitis. This form also has a sudden onset. The child's temperature may jump to 40°C. Acute malaise and headache are usually present from the very beginning. The pain is often projected to the ear. Yellow or white films are formed in the crypts, and these films may spread over a considerable part of the tonsils. The films are loose and easily wiped off. Another form of tonsillitis, less common than the catarrhal, follicular, or lacunar forms, is ulcerative-fibrinous tonsillitis or herpetic angina, first described by the Russian physicians N. Simanovsky and K. Rauchfuss.

The onset of this form of tonsillitis is not acute. The temperature may go up slightly or remain normal, pains in the throat on swallowing are moderate, and mostly located on one side only. A yellowish-green exudate, or film, is seen on the involved tonsil at the beginning of the disease.

The exudate is delicate and thin; it is easily wiped off with a swab of cotton, revealing a shallow ulcer. However, the film will subsequently disappear spontaneously.

The films and ulcers may appear not only on the tonsils, but on adjacent parts of the throat as well. An unpleasant odour from the patient's mouth makes itself known on the second day. The cervical lymph nodes are swollen. In the absence of treatment the course of the disease may be quite protracted, but with proper treatment the child recovers within a week. Another occasional form of tonsillitis is phlegmonous angina (from the Greek "phlegma"—flame, heat), characterised by acute inflammation of the tonsils and peritonsillar tissues.

The child refuses food, complains of severe pain on swallowing (mostly on one side). The temperature goes up to 39-40°C. The course of the disease is a severe one and it calls for prompt treatment. Adenoiditis—"adenoids"—is a frequent ailment in childhood; it is caused by inflammation of the pharyngeal tonsil (the adenoid), and is accompanied by pains in the throat and nose. Malaise, weakness and high temperature are the first symptoms, followed on the next day by a mucopurulent discharge from the nose, by dryness and a burning sensation in the nose and throat, and nasal voice.

True tonsillitis may be followed by complications of either a local or generalised nature.

One of the local complications is the above-mentioned phlegmonous angina which may be the result of either catarrhal, lacunar, or follicular tonsillitis, as well as of a middle ear infection (otitis media); in this case the infection is delivered to the throat through the Eustachian tube that connects the ear and throat. The most frequent generalised complications of acute tonsillitis are rheumatic fever and kidney trouble. A condition called chronic tonsillitis develops in early and middle childhood following recurrent attacks of acute tonsillitis, less frequently only one attack, and in very rare instances it may develop in the absence of acute tonsillitis. In this condition the tonsils are hypertrophied and turn into sites of infection, particularly if the child is subject to recurrent sore throat. Any weakening of the organism causes the infection to become active and brings on fresh inflammation. The tonsillar tissue changes under the impact of recurrent inflammation, and the tonsil loses its protective property (the function of filtering out the infectious germs before they gain entrance to the throat) and becomes a storehouse of infection, a chronic site from whence the germs and the toxins they produce can penetrate into the organism.

Children with chronic tonsillitis complain from time to time of pain on swallowing and of scratchy throat.

The breath of such children often acquires an unpleasant odour.

Occasionally the exudative plugs formed in the tonsillar crypts are dislodged by coughing. Examination of the patient's throat shows spongy tonsils adhering to the adjacent tissues, and white spots (the plugs) or liquid pus in the crypts. As a rule the cervical lymph nodes (the lymph glands scattered up and down the sides of the neck) are swollen and tender. The children frequently look run-down, weak, their sleep and appetites are bad, they become backward at school, complain of pains in their arms and legs. From time to time they have a subfebrile temperature—37.1-37,5°C.

These signs and symptoms are all caused by the germs and their toxins harboured in the inflammed and swollen tonsils. Timely treatment of chronic tonsillitis will prevent the recurrence of acute tonsillitis and its complications. As we have already mentioned, the patient's general state is an extremely important factor in resistance to disease. A sick child should be put to bed immediately and given complete rest; he should have his meals in bed. Particular care should be taken to give the child a lot of vitamins, chiefly vitamin C which helps build up resistance against infections. Vitamin C occurs in raw fruits and vegetables; if the child's throat is so sore that he has difficulty in taking this food he should be given the juice of raw fruit or berries. Such juices are easily prepared by grating or pulping the fruit or vegetable and then straining it through gauze. Juices must be prepared just before a meal, as vitamin C decomposes very rapidly after the raw food has been processed. To avoid irritation of the mucous membrane of the throat the patient's food should be soft, seived, and warm (but never hot). Pungent, coarse, spicy, or acid foods are not allowed. The best foods for children with acute tonsillitis are creamed and puréed soups, thin cereals (gruels), compote (cooked fresh and dried fruits), starch puddings; warm milk and lemon tea are also recommended. Older children may gargle with a weak (pink) solution of potassium permanganate, or with a solution prepared by dissolving one teaspoonful of table salt and $^1/_2$ teaspoonful of baking soda in a cup of warm water. A teaspoonful of boric acid to a cup of warm water also makes a good gargle. Gargling is most helpful when done every hour. Younger children cannot gargle, and they should, therefore, be given drinks of lemon tea as frequently as possible. For older children vapour inhalation may lessen the pain in the throat and serve to remove the products of inflammation of the tonsils (pus and mucus). Special devices exist for inhalation, but the procedure may be quite simple in domestic conditions: place a funnel in the nose of a tea-kettle that has just been brought to a boil, and have the child inhale the vapours through this funnel. Certain herbs may be brewed in the kettle (camomile flowers, the leaves of sage or mint), allowing 2 or 3 tablespoonfuls to a cup of water.

Young children should be permitted to inhale only under the supervision of a doctor or nurse, to avoid the possibility of burning the mucous membranes of the mouth and air passages; older children may do so under their mother's guidance. Another treatment for tonsillitis is irrigation of the throat with solutions of penicillin or sodium bicarbonate. A special sprayer or an ordinary atomizer is used for this purpose. The sodium bicarbonate solution contains $^1/_2$ teaspoonful of baking soda to a cup of boiled water; penicillin inhalations must not be given without the doctor's instruction. Irrigation may be done over one half to one hour intervals. It is not recommended to swab the throat with any kind of preparation. Swollen lymph nodes in the neck are treated, by the doctor's prescription, with warm compresses. However, the compress must be applied correctly. A square of cotton cloth folded into three or four layers is dipped in warm water, or in a solution of one tablespoonful of 40 per cent alcohol to a cup of water, and rung out. The cloth is placed on the throat, from ear to ear (the ends coming almost up to the ears). Wax paper or some thin plastic material is placed over the cloth and covered with absorbent cotton, flannel, or woolen cloth. All this is secured by bandaging, but the gauze should be passed not only around the neck, but over the head, too, to keep the compress in place. The bandage should be fast enough, but not too tight, as it might interfere with breathing. The best time for applying the compress is before putting the child to bed for the night; in the morning it is removed and a dry, warm covering is wrapped around the throat.

The drugs usually prescribed for acute tonsillitis are streptocide (sulfanilamide) or other sulfonamides (sulfa drugs) with the same action, and penicillin tablets. The child is also given something to bring his temperature down, and sometimes drugs for improving cardiac activity. The doctor may want to prescribe penicillin intramuscularly. All these drugs are only given on the doctor's advice, and in the doses he prescribes. When an abscess forms, in cases of phlegmonous angina, it is treated surgically. Chronic tonsillitis is treated by irrigating the tonsils with various preparations, or by cauterising or exposing them to ultraviolet rays. If treatment is of no avail the tonsils are removed surgically. After this operation the general condition of the child improves and the recurrent tonsillitis ceases.

Parents may protect their children against tonsillitis by creating conditions conducive to strengthening the child and building up his resistance. The first thing is to institute a proper daily schedule, provide food of full dietary value, and see that the child sleeps as many hours as his age requires. Physical exercises and environmental inurement (hardening) procedures are extremely conducive to building up resistance to diseases (tonsillitis in particular). Inurement procedures must of course not be commenced when the child is ill, but only when he is in perfect health, preferably in the warm season. Inurement, or hardening, includes sponging the child, pouring water over him (or showering him), air and sun baths. Clothing adequate for the season is also conducive to hardening the child's body. Parents must always remember how important it is for their children to be out in the fresh air every day for many hours. It is advisable to institute inurement procedures from the earliest age, but the doctor's advice should always be taken in selecting the best method. As we have already stated, acute tonsillitis is an infectious disease, and the importance of isolating healthy children from sick ones must again be emphasised. Parents should be aware of the fact that dusty rooms, over-dry air, and smoke are factors promoting the development of tonsillitis. Consequently, rooms in which children live should be aired frequently. It is very important to take the child to the dentist regularly and have his bad teeth treated, or extracted if they are beyond treatment. A frequent cause of acute tonsillitis is adenoiditis, growth of the adenoid (the pharyngeal tonsil). Enlarged adenoids are often the cause of a constantly running nose; by blocking the passage-way from the nose they cause mouth-breathing (the child's mouth is then always half-open) and snoring which disturbs sleep; by blocking up the ear passages adenoids may lower hearing ability and favour ear infections. The most common treatment for adenoids is their surgical removal; this operation is a simple one, and if indicated it must be done in order to avoid undesirable consequences.

RHEUMATIC FEVER

Rheumatic fever has been known to man since ancient times. Various agents were used for its treatment in ancient China, India, and Egypt long before our day. A sufficiently lucid description of this disease was made by the famous Greek physician Hippocrates, who lived about 400 years before the Christian era. Claudius Galen, a great physician and philosopher who lived over two thousand years ago in Rome, already used the term "rheumatism".

Galen held that the disease was caused by a poisonous humour emanating from the brain and spreading over the entire body. And this explains the word "rheumatism"—*rheumatos*, that which flows, a flux, hence *rheumatismos*, a flowing of body humours. In more recent times the term rheumatism was used for various diseases of the joints, muscles, and tendons.

Many diseases having nothing in common with acute rheumatism, or, as it is known in English, rheumatic fever, were formerly united under the heading "rheumatism". As scientific knowledge advanced separate diseases were eliminated from the group of "rheumatic disorders" as independent entities. It is only within the last hundred years that the term "acute rheumatism" or "rheumatic fever" became a definite concept, thanks to the efforts of many scientists, among them the

Frenchman Jean Bouillaud, the German Ludwig Aschoff, and the Russians G. Sokolsky, S. Botkin, N. Velyaminov, G. Zakharyin, A. Ostroumov, A. Kissel, and V. Talalayev. Prevalently a disease of childhood, rheumatic fever is usually observed at the school and pre-school ages, but it may also occasionally affect very young children.

Rheumatic fever is a disease of the entire system, but it generally affects the heart and the blood vessels. The saying that rheumatic fever "licks the joints and bites the heart" is a most apt reflection of the nature of this disease.

Rheumatism in adults is for the most part a continuation of rheumatic fever contracted in childhood. However, the clinical pattern of the disease in adults shows a prevalence of joint involvement, while no such involvement is registered in 50 per cent of child patients, in whom the chief lesions are in the cardiovascular system. The degree of heart injury varies from mild cases terminating in recovery to severe injuries resulting in complete disablement, or even death.

The onset of the disease is not uniform; it mostly appears in the form of an acute rheumatic attack. Sometimes its onset is gradual, starting with the child feeling tired and listless, sleeping poorly, losing his appetite and running a low-grade fever in evenings. In these cases the heart is involved from the very beginning of the disease, but no signs are apparent, and it is only subsequently that the child complains of shortness of breath, piercing pains in the left side, and pains in the arms and legs. The latent period of the disease may be quite protracted, but it eventually flares into an acute rheumatic attack if neglected.

However, by timely treatment of rheumatic fever injury to the heart may be avoided and small lesions may heal without trace. From this it should be apparent that the doctor's advice is always necessary if a child has periods when he is not his usual self, feels tired and run-down, has unexplained subfebrile temperatures; in the presence of such symptoms rheumatic fever must be contemplated.

What is the cause of rheumatic fever? The majority of medical researchers consider that the onset of this disease is conditioned by the presence of two causes—

the bacterial pathogen which is the causative agent of rheumatic fever, and a specific susceptibility of the organism to it. It is now generally agreed that the causative agent is a streptococcus which is found most frequently in children who have rheumatic fever. However, the problem still awaits its final solution. Evidently, the disease becomes apparent only after the germs or the toxins they produce have already repeatedly penetrated into the body and thus increased its susceptibility, a condition known as allergy. The development in a child of such a condition is associated with a number of definite circumstances.

Susceptibility to the pathogen increases most frequently in cases when the body harbours a chronic site of infection (mostly chronic tonsillitis or decaying teeth) from which the germs and their toxins are perpetually delivered into the blood stream. The same thing occurs during recurrent attacks of acute tonsillitis. The toxins circulating in the blood, as well as the products of cellular disintegration of tissues destroyed by inflammation, have a harmful effect on the entire body, but most of all on the cardiovascular system.

Recurrent penetration of these toxins into the system as a whole causes a violent reaction that eventually leads to rheumatic fever. Various unfavourable environmental factors are always conducive to the development of increased susceptibility. Such factors are the absence of a regular daily schedule, lack of fresh air, unbalanced diet, vitamin deficiency, and mental shock or nervous tension.

Colds, or chilling, are particularly important in provoking acute rheumatic fever, "the last straw", as it were. As has already been noted, over 50 per cent of cases of rheumatic fever among children begin with an acute attack. The duration of the attack is approximately two months, and it subsides gradually. The acute onset is characterised by malaise, easy fatigability, shortness of breath, palpitation of the heart. The temperature is usually elevated, but not much. Simultaneous involvement of the joints causes pain in them. Several joints are usually involved, less frequently only one. Heart involvement is not always manifested at the onset of the disease. Morbid cardiac symptoms usually disappear after the termination of the first attack, or very insignificant changes remain. The child feels well, his temperature is normal, and the pains in the joints (if there were any) disappear. The child is dismissed from the hospital. However, the rheumatic process in the heart does not cease during this period, continuing for another few months. This means that at home a special regimen must be observed, and that the child must be under constant medical surveillance. When domestic conditions are normal and treatment is adequate (this will be discussed below) further rheumatic attacks may be avoided. However, occasionally such a lucid interval between attacks may continue for several years and then a new attack occurs with heart involvement which is usually more severe. An acute rheumatic attack may sometimes become protracted, undulating between periods of improvement and aggravation.

Rheumatic fever takes several forms in children: (1) the cardiac form (involving the heart), (2) the arthritic form (involving the joints), and (3) the neural form (affecting the nervous system).

It must be noted that the heart is involved in both the arthritic and neural forms of rheumatic fever, but it is not the prevailing factor in these forms.

In the cardiac form of rheumatic fever the attack starts with malaise and a fever of 38-39°C. Less frequently the onset is insidious.

Acute forms of rheumatic fever have a sharply disturbing effect on the general state of the child. A pronounced symptom is accelerated heartbeat even when the patient is at complete rest. Excessive perspiration, excitability, lack of appetite, decreased blood pressure, and blood value changes are noted. The cardiac form of rheumatic fever lasts from 2 to 4 months. Valvular lesions, if they occur, are formed no earlier than 5-7 weeks after the onset of the disease.

In the arthritic form involvement of the joints is manifested in addition to malaise and elevation of the temperature. In some cases the joints become very painful, warm to the touch, swollen, and the skin over them is flushed. In other cases there may be no swelling or redness of the joints, only painfulness (arthralgia). In the majority of cases many joints are involved, mostly the joints of the knees, elbows, ankles, and wrists, and the small joints of the hands and feet. The inflammation travels from one joint to another, the pain in each joint usually lasting about a week or a week and a half, after which the disease leaves no traces in the joints. Heart involvement is simultaneous.

The neural form of rheumatic fever is called chorea minor; it develops in cases when the rheumatic process involves the nervous system. The child's sleep becomes restless, while in the waking state he is very unstable emotionally, highly irritable, and unable to control the actions of his muscles, which results in facial grimacing and prolonged involuntary movements of the hands and feet. These children become backward at school and their handwriting turns slovenly. The condition is aggravated when the parents or teachers do not understand the nature of the child's restlessness and consider it to be naughtiness, scolding the child accordingly. Occasionally speech may be impaired. The duration of the acute period of chorea is one and a half to two months, after which the described manifestations gradually subside; however, residual disorders may remain in the form of emotional instability, and a twitching of the extremities and facial muscles that subsequently disappears. About one half of children with chorea minor also show heart involvement.

How does rheumatic fever affect the heart?

This question must be dwelt upon in greater detail, since lesion of the heart is the essential feature of rheumatic fever. The human heart is a hollow organ consisting of three layers. The membrane which lines the interior of the heart is called the endocardium, the middle layer is the muscular tissue of the heart and it is called the myocardium, while the membraneous sac enveloping the heart is called the pericardium. The flow of the blood through the heart is regulated by valves coated by the endocardium. The most frequent lesions of the heart are simultaneous involvement of the endocardium and myocardium (the inner and muscular layers of the heart). Sometimes the process involves all three layers of the heart. When the heart is affected by the rheumatic process specific nodules, called rheumatic granulomas, are formed in its tissues. It takes three months for such a nodule to form. Subsequently the nodule consolidates, forming a scar. The entire cycle occurs within four months.

However, these nodular lesions do not appear in the heart immediately after the onset of the disease; it takes about one and a half to two months for their formation to commence after the onset of the disease. The development of rheumatic process as a whole continues for no less than six months.

All this shows that a child who has had an attack of rheumatic fever is in need of very careful management. As we have already stated, in the majority of cases a first attack of rheumatic fever, when properly attended, terminates favourably, leaving in the heart no changes that affect blood circulation. However, development of the nodules and scars on the valves deforms the latter, leading to a residual heart disease which depends on the extent of the lesion and on the valves involved. This occurs chiefly during recurrent attacks. Adequate delivery of blood to the entire body depends on the proper functioning of the heart. Consequently, injury of the heart or its valves disturbs blood circulation, and thus impairs the function not only of the heart alone, but of other organs as well. Prompt treatment alleviates the heart lesion and all its consequences, making them less pronounced.

A child with rheumatic fever (during the acute period) is in need of prompt hospitalisation. Although no specific medicines have as yet been discovered for the treatment of rheumatic fever, still physicians do have a number of drugs that are affective in the symptomatic treatment of this disease. Among them the most widely used are sodium salicylate, aspirin, and preparations of similar action (pyramidon [aminopyrine, amidopyrine], butadione, etc.).

The hormones produced by the adrenal cortex and the hormone secreted by the pituitary gland, ACTH, have in recent years been used extensively in the treatment of rheumatic fever. Antibiotics (penicillin, tetracycline, terramycin, and others) are prescribed for clearing up the infection that has started the rheumatic changes in the body. Other preparations are also employed for rheumatic fever. Parents must understand that only a doctor can select the drug and plan the treatment in every individual case; amateur doctoring may aggravate rather than improve the child's condition.

A child who develops rheumatic fever is in need of very strict bed rest and a peaceful environment; gradually, as the condition improves, the doctor will decide just when and how much exercise the child may begin taking. A wholesome, well-balanced diet with an adequate supply of vitamins should be provided, and, naturally, the child must have as much fresh air as possible.

In the hospital the child is given proper nutrition, medication, and physiotherapeutic treatment in accordance with the stage of his illness and its specific pattern. It is much easier to control a child in a hospital than at home. The regimen is strictly observed in the hospital, where all conditions exist for functional tests of the involved organs. After the child has been dismissed from the hospital (generally following the termination of the acute attack) all steps must be taken at home to prevent a recurrence of the attack. For this the child's resistance to infections must be built up by an adequate daily schedule, sufficient sleep, sufficient fresh air, proper management of nutrition and meals, physiotherapeutic exercises, and sometimes continued drug therapy. The child should be examined regularly by the district rheumatic fever specialist or pediatrician. In many cities and regions of the Soviet Union special antirheumatic sanatoriums for children have been established which provide excellent conditions for the convalescence of patients recovering from acute rheumatic fever.

It is very important for the future psychological state of the child that he never be told of the danger of his disease, nor be threatened with its consequences, notwithstanding the gravity of the case.

The patient's belief in his recovery must be supported by all means, he should be kept in a cheerful and peaceful mood, and emotional upsets should be avoided. The child must not feel himself an invalid. In the convalescent period all studies and physical exertions must be under strict medical control.

Children who have had an attack of rheumatic fever and have subsequently returned to school are given an extra free day from school in the middle of the week for a certain time. These children do not take gym lessons with their class, but attend special groups where the physical load is adapted to their condition. Therapeutic exercises may be conducted at home if the child does not attend school. The local rheumatologist or pediatrician will show the mother the exercises the child should do, and she will be able to guide the child herself. Change of climate (taking the child to a health resort, for instance) is permissible no earlier than 8-10 months following discharge from the hospital, and only if there are no manifestations of an active rheumatic process in the child. The child may be sent to a local antirheumatic sanatorium for convalescence much earlier than the above period. In the interval between attacks rheumatic children should not be sent to summer camp, or to the country with the crèche or nursery school they attend, as the routine of these establishments is planned for healthy children.

If the child is not placed in a specialised convalescence sanatorium it is best to take him out of town for the summer months, but he is in need of a strict regimen.

Since it is much easier to prevent a disease than to cure it the extreme importance of the prophylaxis of rheumatic fever (as well as of other diseases) must be fully realised. The continuous growth of the welfare and cultural level of the population is a salient factor in lowering the frequency of rheumatic fever. We have already spoken of the prevention of recurrent attacks of rheumatic fever. The protection of healthy children against this disease also resolves into providing the most favourable conditions, in observing adequate daily schedules, in seeing that the child has active recreation and sufficient sleep, and also that he gets a full-balanced, wholesome diet.

The important part played by vitamins in the prevention of diseases in general and of rheumatic fever in particular cannot be overstressed.

Particularly important are the B group of vitamins, and vitamin C. Systematic hardening of the body by water procedures, physical exercises, moderate sunning, and outdoor activities enhance the stability of the organism against disease. It is a well-known fact that dis-

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eases of the nose, throat and tonsils, as well as the presence of carious teeth, are conducive to the development of rheumatic fever.

Consequently, we see that the prevention of acute tonsillitis, the treatment of sore throat and chronic tonsillitis and timely care of the mouth and teeth in general are most prominent in the prevention of such a serious disease as rheumatic fever.

ANEMIA IN CHILDHOOD

Anemia is usually understood as a definite disorder manifested by pallor of the skin and mucous membranes. However, it must be pointed out that paleness may be due to conditions which are not associated with anemia; sometimes it may just be a trait of the skin and of the depth of the blood vessels embedded in it, another time it may depend on low blood pressure, etc.

The prevailing constituents of human blood are numerous red and white blood cells or corpuscles. The number of leukocytes (white cells) is approximately 600 times less than the number of erythrocytes (red cells). Although the functions of the white blood cells are extremely important, as they capture and destroy germs, we shall not discuss them, since in this chapter we are concerned with bodily processes associated with anemia, a condition in which the leukocytes play a very small part.

Every cubic millimetre of blood contains from 5 to 5.5 million red blood cells. Their dimensions are very small, but if these cells, invisible to the naked eye, were to be collected from the entire body and placed one-thick on a flat surface they would occupy an area of 1,000 sq. m.

The red colour of the erythrocytes is due to the hemoglobin they contain. Hemoglobin is a compound substance that possesses the property of taking up oxygen, a gas necessary for respiration that is contained in the surrounding air, and of releasing the oxygen to the body cells in exchange for carbon dioxide, a waste product of the latter.

The life span of one red blood cell is about three and a half or four months. New erythrocytes are formed in the red bone marrow, from whence they emerge into the blood to take up their work of carrying oxygen from the lungs to the tissues and carbon dioxide from the tissues to the lungs.

Anemia may be due to a disturbance of the formation of either hemoglobin or erythrocytes. Usually the two processes are concurrent, but the result is the same in both instances: the cells do not get enough oxygen.

The above explains why no doctor will ever risk diagnosing anemia without first doing blood tests.

Let us consider separately the forms of anemia peculiar to children of the younger and older age levels. Notwithstanding the fact that the causes of some types of anemia are one and the same at various ages, the manifestations of the condition differ, as infants and babies react differently to these causes than older children do.

The most frequently observed type of anemia among very young children is anemia caused by faulty nutrition. This anemia is rarely seen in breast-fed infants and falls chiefly to the lot of bottle-fed babies. The basic cause is a monotonous milk or cereal dietary, and also a lack of vitamins in the baby's food.

Anemia associated with some disease is not uncommon in young children. Such "infection" anemias are either a result of the direct action of the bacterial toxin on the bone marrow, or are caused by the monotonous and restricted diet employed for the treatment of the basic disease.

The most typical forms of anemia among children of the pre-school ages are those caused by a worm disease or by faulty hygiene.

The worms that induce anemia are the broad (or fish) tapeworm and the whipworm.

Among older children anemia due to mishandled nutrition is rare. When the child already has the same meals as the rest of the family has his diet is ordinarily sufficiently variegated and wholesome.

Anemia due to faulty hygiene has become just as rare in the Soviet Union. In the majority of such cases the site of some insidious disease is discovered, and only very few children develop anemia owing to a sedentary life, exhaustion, absence of fresh air and sun, neglect of physical culture and sports.

The usual complaints of anemic children are pallor, listlessness, lack of appetite and loss of cheerfulness in babies; malaise, a buzzing in the head, headache, palpitations, poor sleep, constipation, flabbiness, rapid fatigability in older children. One and the same cause underlies all these complaints: oxygen deficiency.

Painstaking investigations of various types of anemia have been instrumental in providing medical science with adequate information on their causes and on the mechanisms of the processes occurring in the body; knowing the mechanism we are enabled to treat the process by means of the numerous excellent preparations the pharmaceutic industry provides us with. However, one form of treatment is irreplaceable in all types of more or less far-gone anemia; this is blood transfusion.

Anemia, as any other disease, is easier to prevent than to cure.

A most important condition for preventing anemia is proper management of nutrition from the very first days of the baby's life. The best food for infants is breast milk. However, breast milk meets the child's bodily requirements only until a certain age, after which it is necessary to introduce solids. The vitamin requirements are satisfied by timely introduction of juices. As the child becomes older his food must become more and more variegated; a corresponding chapter in this book deals with dietaries.

No less important are proper hygiene, hardening procedures, and fresh air. It is imperative for older children to follow a strict daily schedule, to do setting-up exercises in the morning, to spend enough time in the fresh air, and to go in for sports.

TUBERCULOSIS IN CHILDHOOD

Routes of Infection

Tuberculosis (TB) is a communicable disease particularly dangerous for children. It is caused by a rod-shaped bacterium—the tubercle bacillus which is known as t.b. The tubercle bacillus retains its viability in dark, damp places for prolonged periods of time, and it is not destroyed by desiccation, but it is killed quite rapidly by direct sunlight, by boiling and by disinfectant solutions (20 per cent calcium hypochlorate, 5 per cent chloramine, 10 per cent lysol).

The tuberculosis infection may be acquired at any stage of childhood, but babies and young children are most susceptible. The most frequent source of infection are adults who have the open form of tuberculosis, particularly when the patient and the child live in close proximity and proper hygiene is not observed.

The patient disseminates the tubercle bacilli into the air in drops of moisture when he coughs, sneezes, or simply talks, and these droplets may easily be inhaled by the child. Infection may likewise occur through dust containing TB germs from dried-up sputum. Babies are easily infected by sucking their fingers contaminated with the bacilli while crawling around on the floor.

Another easy route of infection is through dishes, domestic objects, clothing, or towels used in common with the patient.

Man is not the only source of tuberculosis infection; the disease may likewise be transmitted by tuberculous animals (cows, goats) through raw milk and insufficiently cooked meat.

Prevention of Tuberculosis

As we have already pointed out, it is much easier to prevent a disease than to treat it. This is true of tuberculosis, too. It is quite feasible to avoid infection even when the child and the patient live in the same room.

The patient's personal hygiene and domestic hygiene are most essential. The patient must be provided with a special spittoon which should be boiled every day (together with the sputum) for 15 minutes in 2 per cent soda in a special utensil. The sputum may also be disinfected with one of the previously mentioned disinfectants (the spittoon is filled to $^1/_3$ capacity before being used).

The tuberculous patient should avoid close contact with children: he should not pick them up nor kiss them; he should use his own dishes, towels, bedclothes. The patient's bed should be at least 1.5 or 2 m away from the beds of healthy members of the family, and it is advisable to place a screen around it.

When the patient coughs or sneezes he should place a handkerchief over his nose. The patient's bedclothes, body linen and towels should be kept in a separate bag and laundered separately; they should be boiled with lye (caustic soda).

Coloured clothes that may be spoiled by boiling are soaked, before washing, in a disinfectant solution.

The child is in particular danger of infection if he is nursed and cared for by his tuberculous mother when she is afflicted with the open form of the disease. But infection can be avoided in these cases, too. The mother may breast-feed and care for her child only by the doctor's special permission. Before she approaches the baby she must wash her hands, place a mask made of 3-4 layers of gauze over her nose and mouth, and put a clean gown over her clothes, as both the hands and the clothing may harbour tubercle bacilli, while the mask will prevent the dissemination of sputum when the mother coughs or sneezes.

In the Soviet Union a special veterinary inspection protects children against transmission of tuberculosis by infected cattle. The milk of patently infected cows is not used for food at all, and the milk of infected animals, or of animals of unknown health, is either boiled or pasteurised (heated to 61-65°C for 30 minutes).

Scientists have now learned that infection of a child with tuberculosis does not necessarily lead to the development of the disease. Spontaneous cures are very common. This is due to the natural protective properties of healthy organisms. However, a weakened child cannot withstand the infection and develops the disease.

The child's stamina should be built up by adequate nutrition, a regular schedule, and wide use of natural factors and physical exercises—topics that are dwelt on in detail elsewhere in this book.

Inoculations Against Tuberculosis and Their Importance

It has long been known that certain communicable diseases confer an immunity to reinfection with the same disease (measles, scarlet fever, smallpox and chickenpox).

Subsequently medical researchers found that it was possible to create an artificial immunity against these diseases by protective inoculations of the body with killed or weakened germs (vaccines).

Two French scientists, Leon Charles Albert Calmette and Camille Guèrin prepared a preventive vaccine for tuberculosis, which is now called BCG. Injections of this vaccine are widely used in almost all countries of the world. The incidence of tuberculosis among inoculated subjects has been reduced 5 to 7 times, and even if an inoculated child does contract tuberculosis its form is very mild. The initial BCG vaccination is done in the maternity home in 3 stages—on the 3rd, 5th, and 7th days after birth; the vaccine is given by mouth in a small amount of breast milk. When the inoculation has not been administered in the maternity home for some reason or other it may be given at some later date.

The vaccine is absolutely harmless and has no effect on the general state of the child. Immunity against tuberculosis develops in 6 to 8 weeks following the initial vaccination and lasts for about two years. During the first 6-8 weeks, while the immunity is being built up, the infant should be isolated from tuberculous patients. All measures associated with the isolation of the patient, or of the child from the patient, are carried out by the district antituberculosis dispensary (a special clinic) and the children's polyclinic.

Revaccination is performed when the child is 2 and 7 years old (the school entrance age), and then at school when he is in the 4th, 7th, and 10 grades, that is, at the times when the immunity to tuberculosis weakens. Revaccination is applied to the surface of the skin, similar to vaccination against smallpox, and it is done only for children who are neither infected nor ill with tuberculosis.

In order to find out whether a child has to have a revaccination it is necessary to discover whether he harbours the tubercle bacillus in his system or not. For this a tuberculin test is done (the Pirquet test), the child's chest is x-rayed, and he is examined by a doctor. If the child is healthy BCG revaccination is done. If he proves to be infected revaccination will be of no avail, and it is therefore not done; in such a contingency the child is placed under special tuberculosis surveillance at his local polyclinic and at the tuberculosis dispensary.

Symptoms of Tuberculosis in Children

After the tubercle bacilli have penetrated into the human body they may be delivered with the blood to any organs or tissues, where they form very small sites of inflammation which resemble tubercles, giving rise to the Latin term of the disease, tuberculosis.

When the course of the disease is a favourable one the tubercles are either resorbed or healed, leaving a scar. The scars may remain throughout life, causing no harm, but when the body is weakened the tubercle bacilli may again commence multiplying, thus causing the disease to become active.

In childhood the tubercle bacilli mostly penetrate into the bronchial glands situated in the chest in the area of the bronchi and large blood vessels. Affection of these glands may be either manifest or concealed. In the manifest case the disease resembles grippe, influenza, or pneumonia. The child's temperature is elevated, he develops a cough, his appetite and colour deteriorate, he loses weight. The temperature may continue to be elevated for a prolonged period of time, in distinction from grippe or influenza, and should alert the physician to the possibility of tuberculosis.

In many cases the onset of the disease is insidious, particularly in school children. These cases follow a course of so-called chronic tuberculous intoxication, displayed by fatigue, listlessness, moodiness, poor concentration, poor school work. There is usually a lack of appetite, a chronic low-grade fever (37-37.5°C) with periodic elevations. Firm superficial lymph nodes are observed; they are usually multiple and enlarged, their dimensions reaching those of a millet grain or even of a bean.

Chronic tuberculous intoxication may likewise follow the penetration of the tubercle bacilli into other nodes, tissues, or organs, and be caused by the action of the toxins they produce.

Tuberculosis of the lungs is less frequent in children than in adults, but it is much more serious. The tubercle bacilli penetrate into the lungs, causing pneumonia resembling ordinary pneumonia. This is a protracted disease with chronic low-grade fever.

In childhood tuberculosis is apt to affect the superficial lymph nodes (prevalently in the neck), causing their liquefaction and break-down with formation of fistulas or open sores, as well as involvement of the eyes and skin (scrofula).

Tuberculous involvement of the bones and joints is a very gradual process. The larger joints are usually affected—the knee joints and the hip joints. When these joints or the spinal column are involved the child at first complains of pain on moving; he gradually acquires a limp, or, in the case of involvement of the spinal column, a hump.

All these complications (or sequelae) may be avoided by timely treatment.

Even such a serious disease as tuberculous meningitis (inflammation of the meninges, the membranes covering the brain and spinal cord) that was formerly absolutely fatal is now perfectly curable with early institution of treatment.

Children get tuberculous meningitis much more frequently than adults do, particularly in families where there are patients with the open form of tuberculosis. The onset of the disease is usually gradual. At first the child may become listless and dejected, easily tired, complain of headache; later vomiting and after some time drowsiness develop. In almost all incidences of tuberculosis in children the tuberculin tests are positive.

Diagnosis of Tuberculosis in Children

In the majority of children the tuberculosis infection may pass by unheeded, hence the importance of early diagnosis and prevention of the development of the disease.

Medical science now has at its disposal simple, but very sensitive tests for the early diagnosis of a tuberculous infection (the Pirquet test and the still more sensitive Mantoux test). In these tests the human skin is injected with tuberculin (extracts of killed tubercle bacilli). Twenty-four to forty-eight hours later the site of infection swells slightly and becomes red if the child is infected; if he is not, the skin remains unchanged. Tuberculin tests are done beginning with the third month of life, and, if negative, are repeated 3 times a year, or 4 times if the child is in constant contact with a TB patient. These tests are absolutely harmless. They are done for all children in schools, pre-school establishments, children's polyclinics, antituberculosis dispensaries. Children from families with tuberculous patients should be under constant surveillance of the district antituberculosis dispensary, where their chests are x-rayed at regular intervals; when the doctor finds it necessary the temperatures of such children are taken regularly and recorded. The child should be subjected to a thorough medical examination upon the slightest suspicion of tuberculosis.

Treatment of Tuberculosis

In all forms of tuberculosis paramount importance is attached to proper care and management of the child's regimen, including the use of all natural factors that strengthen and harden his body. The importance of building up resistance may be illustrated by the fact that certain forms of the disease are cured without the administration of the newest drugs, such as streptomycin, phthivazide (derivative of isonicotinic acid hidrazide), PAS (para-aminosalicylic acid), and others.

The disease requires utmost utilisation of fresh air, physiotherapeutic exercises, sun, and water—matters that have already been spoken of quite comprehensively in this book. However, utilisation of native factors must be carried out under the physician's guidance. Tuberculous patients are treated at local clinics and in regional sanatoriums. Only certain forms of tuberculosis in children are more easily brought under control in the softer climate of the mountains and by the seaside.

A point no less important than natural factors in proper nutrition is that infants be given breast milk and solids as befits their age level.

In planning dietaries for older children the child's age and nutritional condition must be considered; overfeeding and excessive amount of fats are impermissible, since this often causes more harm than good. A well-nourished child should receive the food that is appropriate for his age, while undernourished children are given a 20 to 25 per cent more wholesome diet (in quality rather than in quantity).

A well-balanced diet must contain a variety of wholesome dishes with a sufficient vitamin content; the latter is ensured by giving the child enough vegetables, fruits, and berries, both raw and cooked, and also fish-liver oil.

The activity of the tuberculous schoolchild has to be restricted; when necessary such children are excused from examinations and are given additional free days; they are also placed in special out-of-town boarding schools (forest schools) and are given accommodation at special overnight sanatoriums.

NURSING AND MANAGEMENT OF CHILDREN DURING ILLNESS

Medical science and the pharmaceutic industry are constantly evolving new drugs; however, notwithstanding their powerful action it is extremely important for a child to be nursed through an illness properly, with painstaking and patient care. The purpose of nursing is to help the body cope with the disease afflicting it, and for this bodily strength has to be maintained. Correct nursing is one of the salient points in restoring the health of any patient, especially of young children.

Proper nursing prevents complications. When we speak of nursing in illness we mean scrupulous cleanliness of the child's room, bed, and clothing. The term includes individual hygiene of the sick child and the educational approach to him.

The premises and all the objects surrounding the child are cleaned with moist mops or cloths. Both the room and the bed must be aired daily. The room should be aired no less than three times a day: in the morning, after the mid-day meal, and at bed-time. While the room is being aired the child should be covered up warmly to avoid chilling, or carried out into another room.

The advisability of carrying the child outdoors is decided by the attending physician; the hours and duration of such outings depend on the age and condition of the child. When a child is ill he needs more air. The temperature in the room should be kept at a constant level of 16-18°C for all children; newborn and mature infants require a higher temperature—20 to 22°C. Overwarm rooms are just as harmful for children of any age as overcold rooms, and both may lead to illness.

The *bed* of the sick child should be placed in the lightest part of the room, and should never be cluttered up with anything such as clothing, underwear, etc., lying or hanging on it. Some waterproof material must always be placed in the bed, even if the child is toilet-trained, as it is easier to wash the perineal area in bed and to place the child on the bedpan or potty without fear of wetting the mattress or pillow. A diaper, which should be changed frequently, is placed above the waterproof. The child is covered with a warm, light blanket or sheet, depending on the temperature of the room. Utmost cleanliness of the bed and bedclothes must be observed; anything even slightly soiled by urine, feces, sputum, or vomitus should be immediately replaced by fresh things. The bed clothes should be changed no less than once a week, and the body clothes—every day. A small nursing table standing near the child's bed is convenient for holding the various objects needed in the care of the patient, and a towel for wiping his hands and face is placed on it.

Body linen worn by the sick child should be light and warm, and easily removed. Clean garments are kept separately in a special place used only for this purpose (a chest of drawers, wardrobe, closet, etc.). Soiled laundry is kept in a special box or bag. Bedding or clothing soiled with vomitus or feces should never remain dirty for any length of time; they should immediately be soaked in a disinfectant (30 per cent carbolic acid, or 0.25 per cent chloramine). Before the clothes are washed the disinfectant is poured off and they are flooded with hot water. The pail and basins from which the dirty clothes have been removed are scrubbed thoroughly and scalded. The pails should have close-fitting lids to keep out flies. Such precautions are particularly important in the case of dysentery, infectious jaundice, or other infectious diseases.

Not a single disease, be it even of a febrile nature (excepting certain skin conditions) *is an impediment to repeated daily sponging and washing, or to daily baths.* The toilet of the very young child is particularly important. A sick child is sometimes irritated by any handling, therefore his toilet should be made cautiously, taking care not to tire him or cause him pain. When a child is severely ill his face, throat, neck, the skin behind his ears, and the creases in his skin are swabbed with cotton dipped in boiled water. The patient's hands are washed several times a day; each hand is washed and dried separately. The nails are cut very short. The perineal parts are washed every day, either in a small basin, or by sponging and drying in bed, after first placing a folded diaper under the child's buttocks. A toilet-trained child is placed on his potty, when the condition is severe a bedpan is used.

In giving *hygienic baths* care must be taken not to tire the patient. The room in which the bath is given should be warm (20-22°C), the temperature of the bath-water 36-37°C; warmer water soon affects the child's mood, he cries, frets, and gets no pleasure out of his bath. The child should not be kept in the water for longer than 5 to 7 minutes. First the scalp is washed, then the shoulders, arms, and hands, then the trunk, legs, and buttocks. The face is washed with water poured out from a jug or can, and the whole body is rinsed off with water from this jug after the bath. The temperature of the rinsing water should be 1° lower than that of the bath-water. If the patient's condition or some other reason does not permit an immersion bath, a sponge-bath may be given: the child is undressed and covered with a light blanket; the end of a towel is moistened in warm water, one leg is sponged and immediately dried and covered, then the same is done with the other leg, and so on, until the entire body has been sponged and dried, part by part, ending with the chest and abdomen, after which the child is dressed in his sleeping garments. Drying is effected by patting the skin through a soft towel, not by rubbing. The best time for bathing the child is in the evening, before the last or second to last feeding. Some children sleep worse after a bath, particularly if they have been overwarmed in it. The mildest soap should be used, preferably special baby soap.

Therapeutic baths containing sea salt, bran, potassium permanganate or other substances are given by the doctor's orders. Babies and young children are frequently given potassium permanganate baths. The proper solution is made by adding a tablespoonful of a 5 per cent potassium permanganate solution to a pail of water, so that a pinkish-violet colour is obtained. Never put crystalline potassium permanganate into the bath-water, as the child may be injured by undissolved crystals adhering to his skin or eyes.

Nose and ear hygiene. These organs need to be cleaned every day in the newborn, and in older babies or children in cases of nose or ear disease. The cleaning is done with a firm twist of cotton dipped in warm water, a separate twist for each ear and nostril being used. The child should be seen by the doctor if he has a foreign body in his nose or ears (a pea, bead, or some similar small object that little children often stuff into their ears or nose); parents should not try to extract the object themselves, as it is very easy to injure the mucous membranes which swell up immediately, making it difficult to remove the object.

Nosebleed may be due to various causes, such as certain diseases (influenza, measles, scarlet fever), sudden high fever, or injury. The first thing to do is to place the patient so that his head is higher than his legs, but not thrown back too much, as otherwise the blood will run down his throat. The bleeding nostril is closed by pressing on it for 10 to 20 minutes. If both nostrils bleed the nose is pinched between the fingers. An older child is told to breathe through his mouth. A cold wet towel or ice are applied to the back of the neck and to the face; the face may also fe washed with cold water, as cold constricts the blood vessels. If this does not help a swad of cotton moistened with ephedrine or hydrogen peroxide is tucked into the nostril or nostrils. Nosebleed is frequent in children who have adenoids, as they are apt to blow their noses too hard when they have a stuffy nose, thus breaking the small blood vessels in the nose. Recurrent nosebleed requires medical attention.

Before putting any drops into the child's nose the nostrils should be cleaned with a twist of cotton; the child is placed on his back with his head thrown back slightly. The drops are taken up into an already prepared dropper, and then swiftly instilled in each nostril (as prescribed by the doctor). One should remain calm and not hurry when putting drops in the child's nose, as he will not like any drops on his lips or chin. It is not advisable to put drops into the nose directly after or before a meal, as the procedure might induce vomiting.

When necessary, the *eyes* are cautiously wiped with a piece of cotton moistened in a weak solution (2 per cent) of boric acid; a separate swab is used for each eye. The eyes are wiped from the outer to the inner corners, from temple to nose. Eye-drops should be instilled with a clean, boiled dropper. The number of drops prescribed by the doctor are taken up into the dropper and instilled in the outer corner of the eye, after which the eye is wiped carefully with a bit of cotton. Droppers for the eyes and the nose should be kept separately, and boiled after being used (they are kept in jars covered with gauze or with a lid).

Care of the mouth. Special care of the mucous membranes of the mouth is needed only in cases of local disease (thrush, stomatitis). It is not advisable to wipe out the mouth of a healthy child, as it is quite easy to abrase the tender lining.

Thrush is a fungus infection of the mouth which looks like patches of milk scum. These patches are removed with cotton tampons moistened in a 2 per cent solution of either soda or boric acid.

Crying. In the majority of cases children cry because of pain, but it is often difficult to tell where the pain is and what causes it. Infants may become fretful owing to quite a number of causes—uncomfortable position, a hard rib in the diaper, some slight diaper rash; all these things have the effect of strong irritants on the tender, delicate body of the baby, and he reacts by loud crying. Even healthy, properly nourished children may be subject to abdominal pains. The digestive organs are still immature at this early age. Sometimes the baby calms down after being placed on his stomach for several minutes since gas is passed more easily in this position. Warmth is also helpful; for instance, a flannel diaper or thin blanket may be folded into several layers, warmed, and then placed over the baby's stomach. Finally, when the abdomen is distended the baby may be given a warm (38°C) enema, but this should not be done habitually.

It is recommended to use boiled water for an enema. The newborn is given 50 to 60 ml of water (rubber syringe No. 2), the volume of water for 6-7-month-old babies is 60 to 100 ml (syringe No. 3 or 4), older babies and young children are given from 200 to 250 ml, or one cup of water (syringe No. 5 or 6). The temperature of the water used for a purging enema should be 30-32°C; for older children it may be lowered to 22°C.

Purging enemas. Purging enemas are given in the absence of spontaneous defecation for over 24 hours, or when the baby's abdomen is distended and he is fretful. The syringes used for infants and babies either have a soft tip, or a rectal tube used for relieving flatulence is placed over a hard tip. The purpose of a purging enema is to stimulate a reflex action in the rectum and the higher portions of the intestine. The reflex is provoked by the volume of the water and its temperature which is much lower than the temperature of the baby's body. Consequently, if the enema is given with warm water the water will be absorbed and no bowel movement will occur; the same thing will happen if a too small amount of water is injected into the rectum. When the water is drawn into the syringe care must be taken not to leave any air in it; for this the tip of the syringe should be raised upward and the bulb pressed lightly until water appears at its tip; then, without releasing pressure on the syringe, the tip is again immersed into water, and the ball is released. The child is placed on his right side and the tip of the syringe (first dipped in vaseline) is cautiously inserted into the anus to a distance of 3 cm, after which the rubber bulb of the syringe is slowly squeezed until all the water leaves it. Thus compressed, the syringe is removed, and then the buttocks are pressed together for 3 to 5 minutes to keep the water from coming out. Medicated enemas are given by prescription.

Fretfulness due to flatulence may be overcome by introducing a gas-relieving tube into the anus.

Should the baby cry owing to *earache* the doctor will usually recommend a warming compress or warmth to the ear. The warming compress is made in the following manner: a four-layer piece of gauze or a clean bit of cloth is moistened in room-temperature water and placed behind the ear; a slit should be cut for the ear itself to protrude from; wax-paper or a plastic material are placed over the wet cloth in the same manner, then comes a swad of cotton that covers the ear too, so that neither the wet cloth nor wax-paper are visible, and the whole contraption is bound up, not too tightly. The compress is kept in place for 4 hours; after its removal the ear is bound up with cotton alone for warmth.

Fretfulness due to mishandled nutrition may be observed even in healthy children. The appetite is usually impaired, the child refuses not only food, but even drink, and this lowers his resistance greatly. The mother's task is to give the child a sufficient amount of fluid in the form of tea sweetened with sugar, honey, jam, or fruit juices. A sufficient fluid intake is necessary for the proper functioning of the cardiovascular system, and without it no medicines can be effective.

Much patience is necessary in breast-feeding an infant when he is ill; sometimes it may be necessary to express the milk manually and offer it to the baby frequently, in small portions (a teaspoonful at a time).

Sometimes older children also persistently refuse to eat; in such cases it is advisable to use methods which are impermissible when the child is healthy, such as persuasion, insistance, and even offering a selection of favourite dishes. The mother should strive to get a sufficient amount of food into the child in the course of the day.

The most common ailments of childhood are upper respiratory infections and pneumonia. Even a slight cold in the head will severely upset an infant, he may not be able to suck, and therefore becomes very restless. Such conditions are usually alleviated by mustard packs and mustard plasters.

Mustard packs. Children of any age may be wrapped in mustard packs. The procedure is as follows: approximately 2-3 tablespoonfuls of dry mustard are stirred in a cupful of warmish water in a small basin which is then covered with a lid or a diaper and put in a warm place for 20 minutes. When the mustard emits a pungent odour that irritates the eyes and nose the volume of liquid is made up to 1 litre with water heated to 40°C; the liquid is stirred, and a large diaper or a small sheet folded in three is dipped into the mustard, wrung out, unfolded, and the child's back and chest are wrapped in it, making sure that the cloth is warm enough, but will not burn the child. A dry diaper is placed above the wet one, and above this the child is wrapped up in a warm blanket and either held in the arms or placed in his bed. If the mustard is sufficiently fresh the baby will become restless in about 10 or 15 minutes, showing his displeasure, crying out, while an older child will complain of a burning sensation. If no redness appears and the child is peaceful the mustard pack may be kept in place for 20-30 minutes, or even longer. After this the child's skin is wiped dry, he is attired in a warm nightdress and covered warmly.

Ready-made mustard paper is not employed for young children, as their skin is too tender. A mustard plaster is not difficult to prepare at home. Mustard and flour taken in equal amounts (about 2 tablespoonfuls each) are thoroughly mixed, and then stirred with warm water until a thickish paste is obtained. A diaper is folded into four layers, and covered inside with the mustard-and-flour paste. The subsequent procedure is the same as for mustard packs. Mustard plasters are kept in place for no longer than 10 minutes.

Cupping glasses are very rarely used for children younger than 3 years, and only on the doctor's advice, as the technique itself is capable of frightening the sick child and making him restless. Besides, the cups cause an influx of blood not only to the surface of the skin, but also to the deep-lying tissues, and this is contraindicated for young children, owing to their well-developed capillary network of blood vessels that is conducive to hemorrhages in the skin, visceral organs, etc.

Hot footbaths are salutary for children afflicted with diseases of the upper respiratory passages. The child's feet are immersed in a pail containing water warmed to 37-38°C, and hot water is gradually added in order to retain this temperature for about 10 minutes. After the footbath stockings are drawn onto the child's legs and he is put to bed.

Mustard baths. 100 g of dry mustard is dissolved in a pail of water at 40°C, then the water is strained through gauze and poured into the bath. The child is immersed in the water when it cools down to 37°C. The bath is covered with a sheet, only the child's head remaining uncovered, to protect his eyes and nose against the mustard vapours. The duration of the bath is 10 minutes.

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